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## 1.0 EXECUTIVE SUMMARY

The Arizona Partnership for the New Economy (APNE) was established to study Arizona's economic preparedness and make recommendations to improve the state's ability to compete in the global, technology-based economy. APNE identified the development of telecommunications infrastructure in small and rural communities as a top priority. The State of Arizona appropriated funds to the Department of Commerce to implement various recommendations of APNE. As a part of their implementation, they set up a Community Telecommunications Assessment program (CTA). The Department of Commerce encouraged regional applications for these CTA assistance grant funds. The State assistance was intended to enable small and rural Arizona communities to identify localized market-driven strategies to encourage private telecommunications providers to build out their network of telecommunications infrastructure and services or other means of providing access.

The Yuma County Community Telecom Assessment (CTA) Project was one of the recipients of these CTA assistance grants from the Department of Commerce (DOC) Rural Arizona Community Telecommunications Assessment (CTA) program. In August of 2003, Yuma County contracted for the preparation of this Community Telecommunications Assessment.

This CTA Report is intended to present an overview of the recent state of network technology development and use in Yuma County and to identify a variety of infrastructure development and funding options to accelerate the introduction of higher-bandwidth telecommunication services in the County. However, in light of difficulties presented by the current economic environment, the plan is also structured to support creative incremental investments in extending and building improvements in telecommunications infrastructure.

This report presents a snapshot view of recent telecommunications infrastructure development and use in the county. It also identifies problematic areas for infrastructure development and maps interest and demand for enhanced services for specific locations and the county as a whole.

This report discovered several development initiatives by large stakeholder organizations (the City, County, YEC, WAC/NAU, and large school districts) and significant impending DS-3 level connectivity demand that could, combined, leverage substantial public infrastructure development in Yuma County. Two large-scale infrastructure development possibilities are identified:

1. Establishing a county internet access center or "GigaPop" in Yuma around the current OC-3 level internet access demand in the county, to provide true commodity pricing (eventually \$100/Mb or less) of internet access to key organization participants currently ready for DS-3 connectivity and to other, smaller organizations ready to break through the T-1 barrier. This would be facilitated by:
2. A county-wide network, centered on a fiber optic partnership between the City and County governments in Yuma, targeted to supply a wide area gigabit Ethernet capability. The extensions of this network to other Yuma County towns may be hybrids of dedicated circuits and wireless DS-3 segments, but the target, over time, would be to move toward a countywide, public fiber optic network resource. The municipal and county government roles would also require long term incentives to build at all trenching opportunities and to

encourage residential and commercial development to include compatible sub-infrastructures.

This report suggests a number of smaller-scale activities (general and specific) that the Yuma Technology Consortium might undertake to incrementally improve the public telecommunications infrastructure in Yuma County and in each community within the county. Upon determination of which of the recommended alternatives in this plan the Consortium wishes to pursue, it may generate grant funding proposals, publish a Request for Proposal (a RFP) for vendors, evaluate responses, and make a contract award for the implementation of telecommunication infrastructure improvements detailed in this plan.

The report also points out the key importance of governance for any ongoing implementation of suggestions and ideas that may be adopted from this plan. Particulars on a detailed governance structure are presented for reference. Included in those details are goals, objectives and activities that the governing entity and/or its sub-committees might undertake to advance the deployment of broadband infrastructure and access in Yuma County.

## 2.0 THE ARIZONA STATE NETWORK

The quest for information technology efficiencies is a key issue for the Arizona Department of Administration's Arizona Telecommunications System (ATS). These efficiencies are listed as Strategic issue #2 in the ADOA Strategic Plan for FY 2004 - FY 2008:

***Problem:*** *Current thinking and action by public and private organizations envision that a single provider of data, voice, and video platforms is often the most cost-effective means of technology efficiency. It is imperative that opportunities to consolidate the delivery of technology support for business solutions and to provide outstanding service delivery be continuously explored and utilized whenever possible.*

*[ADOA Strategic Plan FY 2004-Fy2008; p 9]*

In 2002, ADOA and the Government Information Technology Agency were required by House Bill 2706 to prepare a report examining a number of options, including privatization, centralization, and public-private partnerships to improve the efficiency and reduce the costs of the Arizona Telecommunications System. The task included reviewing State telecommunications options and submitting a plan to the Joint Legislative Budget Committee (JLBC) by November 1, 2002. All options developed were intended to improve service delivery and increase the fiscal efficiency of Arizona statewide telecommunications services. The report included the following brief network description and a schematic diagram [see Appendix L]:

*In its role as the primary provider of voice and data telecommunications services to State agencies, ATS has evolved a physical architecture for service delivery that reflects the concentration of State agency headquarters and major offices in the Phoenix and Tucson areas. The Capitol Mall in central Phoenix and the State complex in downtown Tucson have State-owned conduits and fiber optic and copper cabling throughout each facility. The Phoenix Capitol Mall and Tucson Complex are tied together by a redundant inter-LATA (Local Access and Transport Area) high-speed OC-3 service leased from a major inter-exchange carrier. Additional leased circuits provide voice and data communications to many agency field offices throughout Arizona.*

The report characterized its recommendation as "a radical departure from the existing service delivery model." The report recommended that Arizona State Government should pursue either a Shared Service or Privatized service delivery model [detailed in the body of the report, found at [http://www.ats.state.az.us/JLBCrpt/JLBC\\_Report.pdf](http://www.ats.state.az.us/JLBCrpt/JLBC_Report.pdf)]. An Alternative Privatization scenario, private ownership of assets, was favored by GITA; however, an ADOA cost evaluation contained in the body of the report concluded that the Privatized model appeared to offer more potential.

The report extensively researched the cost issues of privatization and presented the following three recommendations:

*Arizona State Government Needs to:*

- *Adopt a centralized governance model with strong executive authority and legislative involvement.*
- *Depending on which method of privatization is selected, centralized telecommunications funding to leverage resources and gain greater accountability may be desirable.*

- *Strongly consider the resources available in the private sector either through an outsource (leveraging the economies of scale available through the public/private partnership) or co-source (shared services) to improve efficiency, acquire expertise and ease the financial burden.*

*[from the Executive Summary, Statewide Telecommunications Services; Report to: Joint Legislative Budget Committee - Arizona Telecommunications Services; November 2002; second printing.]*

The emphasis of the report on cost savings, rather than on targeting greater value for current levels of investment, bodes ill for the potential for State infrastructure investment generating collateral benefits such as accelerated broadband access for rural areas. Specifically, the report did not address the potential for the State to serve as "anchor tenant" in rural areas, leveraging its telecommunications infrastructure investment to the benefit of other local telecommunications service users, a strategy that has proved successful in other Qwest-served States, notably Colorado.

The ADOA Strategic plan further elaborates the need for consolidation and elimination of waste in the delivery of services:

*It is the belief of ADOA that current approaches to telecommunications in particular, and to a lesser extent data technologies, consist of unnecessary duplication, overlap, and waste. We are in the process of working with the State agencies to identify opportunities for consolidation. Once potential opportunities are identified for increased cost effectiveness, it is critical that all potential solutions be thoroughly researched, analyzed, and compared to other business systems' needs prior to implementation. This type of comprehensive infrastructure should provide the highest level of quality and cost effectiveness, allow maximum return on the state's valuable resources, ensure effective, affordable state-of-the-art business solutions, and identify exceptions requiring unique business systems. . [ADOA Strategic Plan FY 2004-Fy2008; p 9]*

The potential in rural areas for shared infrastructure (down to the circuit level) is good news. Existing examples of service contracts and intergovernmental agreements (IGA's) between rural infrastructure projects and State agencies need to be expanded into a common "best practice."

Conspicuously absent, however, is any mention of how collaboration with grassroots efforts such as the Southern Arizona Communications Consortium Network (SACCNNet) can improve ATS service delivery.

Whatever direction ADOA takes with the further development of ATS, rural governments will need to make their case for enhanced service and bandwidth access away from the Phoenix to Tucson I-10 axis.

County and local governments should let their legislators know that "penny wise and pound foolish" cost efficiency concerns (*i.e.*, saving money rather than leveraging the existing level of investment) can further impede the synergy and collaboration that is necessary between state and local entities to ensure adequacy of rural infrastructure development. In particular, the rural communities should present a common message of the need to move beyond adequacy for the telecommunications infrastructure's effects on economic development, education, health care and public safety.

Yuma County's relative isolation, border issues, and extensive Federal program presence mark it as unique among Arizona counties and could be presented as a case for specialized planning attention from State infrastructure initiatives. This is particularly true of any development which may proceed from Homeland Defense communications infrastructure investment.

More information and current news can be found on the **Arizona Telecommunications System** (ATS) website at <http://www.ats.state.az.us/>.

### 3.0 THE COMMUNITY TELECOM ASSESSMENT PROJECT

The Department of Commerce for the State of Arizona recognized the crucial importance of information technology infrastructure and access to broadband technology to the economic viability and future of the more rural and remote counties in Arizona. With that in mind, the Department of Commerce created a funding pool for a competitive process that would provide grant funds for a limited number of those rural counties to undertake a detailed assessment of their specific telecommunications needs and opportunities. The competitive application process was conducted through the late summer/early fall of 2002 and a prioritized list of counties was announced in early 2003. An application from Yuma County was submitted in October 2002 and designated as the number two priority grant recipient in the program.

The purpose of the Community Telecom Assessment was to ascertain the existing level of telecommunications demand and applications as well as to determine if potential future demand and applications were sufficient to warrant significant information technology infrastructure upgrade and/or deployment. The CTA included three distinct phases with reporting requirements for each phase:

#### Phase 1:

**Needs Assessment** - This part of the project included public meetings, one-on-one (or phone) interviews with representatives from local governments, health care sector, County and higher education institutions, business owners, and not-for-profit entities regarding current uses and applications for broadband access.

**Surveys** - Two versions (English and Spanish) of a single survey instrument were developed, with local input that targeted residential consumers and business/government/not-for-profit technology users. Information derived from these surveys was critical in helping determine potential demand for broadband service.

#### Phase 2:

**Infrastructure Inventory** - This effort included an assessment of what current infrastructure capacity existed and what technology was available in what locations. It included exploring opportunities for DSL, cable, fiber optic, T-1, Frame Relay, ISDN, fixed wireless, satellite and 3<sup>rd</sup> Generation wireless (PCS picture phones, etc.). Also included was a detailed analysis of existing networks – LANs, WANs, video links, etc. and how much capacity existed within those networks.

**Business Model** - Information obtained from the Phase 1 Needs Assessment was incorporated into this phase which also examined population and household projections, business usage projections, industry statistics, market share assumptions and pricing assumptions. Those were components of a revenue-based model. Cost-based models were also examined during this phase, including those provided in Arizona's Telecommunications White Paper that was funded through another AZ Department of Commerce project.

#### Phase 3:

**Technology Plan** – Information obtained in both Phase 1 and Phase 2 was incorporated into a more detailed strategic plan for making more efficient use of existing network resources, as well as contemplating future investments in upgraded broadband infrastructure. This part of the report explores potential alternatives for various types of technology as well as potential



strategies to fill existing gaps in the network. The discussion in this section includes recommendations for proceeding to the implementation phase.

**Finance Alternatives** – A comprehensive exploration of potential funding sources, including grants, is included as part of the Phase 3 efforts. Without a realistic methodology for funding a regional infrastructure initiative, the rest of the report becomes a fancy piece of shelf art. This aspect of the project is critical to ensuring an outcome-based implementation follow-through. Financing alternatives include a wide variety of approaches, and include a look at the potential benefits of public-private partnerships, joint ventures and publicly financed bond initiatives to support the deployment of advanced technology infrastructure across the Yuma County landscape. These recommendations are incorporated throughout the report, but an exhaustive section just on potential grant applications is included as a separate section.

## 4.0 VISION STATEMENT

A vision statement facilitates communication and task focus for a voluntary group of participants in a wide-area infrastructure development project.

Yuma County has an informal group in place, the Yuma Technology Consortium, established by the local Chamber of Commerce that has focused on infrastructure development as a driver of economic development for the county. The group has been meeting on a monthly basis for approximately three years. The stated purpose of this group has been *to promote economic development through five pillars; 1) e-learning, 2) e-government, 3) infrastructure, 4) knowledge transfer, and 5) creative thinking.*

The drafting of a renewed vision or mission statement should be among the first tasks taken up by the technology/governance group that meets to begin any ongoing development processes for Yuma County that result from this report. The completed statement, which may be as short as a few sentences, will serve as a declaration of interdependence and focus for the ongoing operations of the group.

It should be kept in mind that one of the uses of the vision statement will be to explain or communicate the nature of the mutual aid and benefits sought by the participants. A vision statement may also serve as a précis or summary message to vendors of what next steps or unmet needs the major users in the area want to see addressed.

It may be necessary to follow the brief vision statement with a bulleted list of specific and categorical outcomes expected by the participants. In effect, this document can then become a "to do" list or agenda that can be targeted to be accomplished in the coming year, three years, five years, and so on.

The draft text should be reviewed and approved by appropriate political and managerial persons at participating organizations and this approval should be noted as part of the final vision statement itself.

An example of this style (statement followed by bulleted items) that was drafted by a community planning group in Logan County, Colorado, can be found in Appendix A.

## 5.0 GOVERNANCE PROCESS

[Note: The following elaborate description of a governance process is presented as a conceptual model. Actual ongoing governance for the Partnership may be a much more lean process and will be a matter of determining "what works," in what priority order and for whom.]

The Community Telecommunications Assessment (CTA) reported in this document was accomplished under the direction of the Yuma County IT Department on behalf of the Yuma Technology Consortium (YTC), an informal group comprised of interested member representatives from local telecom/technology using organizations, economic development organizations and other user/stakeholders.

To continue beyond the planning process into implementation of a plan or any of several activities recommended in the plan, the consortium will have to refashion itself into a sustainable and productive form. Over the long term, such an organization will only be sustainable if it can return value to its participants. If it decides to take on a future governance role for infrastructure development in the County, Yuma Technology Consortium must define priorities and goals for near and long term efforts that will follow-up on the potential development possibilities presented in this report.

The governance process will require periodic meetings by representatives of major stakeholders (government, education, healthcare, economic development, etc.) in improving area telecommunications infrastructure. After the initial planning process is completed, the consortium or whatever new group may be formed to take on this task will have to decide how staff support can continue to be provided and on what basis. It may be necessary to establish a new administrative chair of this group to set meetings and distribute agendas and minutes.

Ideally, three committees (or one master committee and two subcommittees or work groups) should be formed to provide governance: 1) the project management committee; 2) an informal technical advisory subcommittee; and 3) a purchasing/legal/business process subcommittee. Each committee should meet at least twice a year, but preferably quarterly, in task-focused meetings. Other possible subgroups for periodic meetings may include a K-12/VOC ED/ Higher Ed special interest group, a grant writers group, and application oriented subgroups such as an IP VIDEO interest group or VOIP interest group. There may also be value in a government applications group.

The **project management committee** will oversee the planning process, grant application or other funding source development, issuance and evaluation of RFPs (if any), generation of group purchase agreements, and the scheduling and build-out of any large-scale infrastructure implementation. It should include as broad a base of stakeholder representation as possible, with representatives from higher education, K-12 schools, the local library, health care, government, public safety, non-profit organizations, the county economic development organization, and the business community.

The **technical advisory subcommittee** should provide a tracking resource for the current state of the infrastructure (what has changed since the last meeting and what is known or planned to be done). This responsibility of this subcommittee could include ongoing mapping of known infrastructure resources such as fiber optic cabling, wireless towers, and other assets that could be of use to a developing infrastructure. It should also educate and inform the project management committee of its local/regional/statewide technology options, act as an

intermediary in communications with vendor representatives, and serve as an educational/issue awareness resource to the larger community. Representatives of the technical advisory subcommittee may be able to present periodic "state of the infrastructure" presentations to city council, county commissioners meetings, and Chamber of Commerce meetings. The technical advisory subcommittee may also consider providing regular presentations to a number of planning and development groups in the county, such as the Greater Yuma Economic Development Corporation, the Yuma Metropolitan Planning Organization (which should be periodically reminded that transportation development and telecom infrastructure development can and should be closely linked), the Greater Yuma Port Authority, and the Yuma Private Industry Council.

The technical advisory committee should review and comment on any proposals submitted in response to issued RFPs and will provide ongoing advice to the management committee in its decision-making process in evaluating any new proposals. The technical advisory committee could also be asked to periodically advise the management committee on the progress and impact of the eventual implementation of the proposed community infrastructure.

The **purchasing/legal/business process subcommittee**, if such a group could be convened, might be the most important working group for the Partnership in the short term. This group could address the issues of how aggregation can be accomplished within the differing business/purchasing/legal environments of its constituents. It also may serve the largest number of interested parties, if group purchase agreements -- for cell phone service, for example -- become an early focus of the Consortium. This subcommittee could also address issues such as:

- Rapid and practical implementation of group purchasing practices for telecommunications network technologies
- A common inter-government agreement (IGA) template, as well as identifying acceptable common versions of other necessary agreements, perhaps modeled on those in use by SACCCNet in southeastern Arizona. (For more information on SACCCNet, see Appendix E)
- Resolution of cost sharing issues for aggregate internet connectivity, including devising a system that allows e-rate recipients to participate without jeopardizing their subsidies
- Addressing legal issues of whether the Partnership would need to have a separate legal status as a cooperative or incorporated 501(c)3.

### **Using Technology for Meetings**

The number of distance education sites in the county would make it possible for governance committee representatives to meet via teleconferencing in late afternoons at several school sites in the county. The use of the distance videoconferencing capability of educational sites would also provide valuable experience with the technology, its current level of performance, and any existing infrastructure problems...

### **Involving the Community of End Users**

The number of organizations that could participate in and benefit from the infrastructure development projects of the Consortium far exceeds the number that can comfortably or

practically be expected to participate in committee or subcommittee meetings, or even attend regular meetings.

Therefore it will be necessary to consider a number of ways to categorize these constituents and communicate with them. The Consortium should identify tiers of interest such as those organizations who cannot attend meetings but want to be notified of group purchase negotiations and agreements. This can be accomplished by continuing, expanding, and segmenting any e-mail and fax notification lists that may have been used to inform interested parties for regular meetings of the consortium. The Consortium may also use these channels to solicit topical comments such as information about interest in specific technologies or RFP processes.

An annual technology and infrastructure conference, perhaps hosted at Western Arizona College, could also serve to increase participation and information sharing in the Consortium. Periodic summary documents, drafted and posted in PDF form on the Yuma County government website could also provide broader communication with interested community members.

## 6.0 DESCRIPTION OF THE COMMUNITY AND AREA TO BE SERVED

### 6.1 YUMA COUNTY

Yuma County is located in the southwest corner of Arizona, sharing its southern border with Mexico and its western border with the State of California. It encompasses a land mass of 5,522 square miles, less than 11% of which is privately owned. The county has a population of 169,760 with a recent growth rate (2000 – 2002) of almost 63%<sup>1</sup>. The county seat is located in Yuma and other major communities include San Luis, Somerton and Wellton. Eighty-nine percent of the County's land is made up of public lands, which include the Kofa National Wildlife Refuge, the Cabeza Prieta National Wildlife Refuge, the U.S. Army Yuma Proving Ground, The Yuma Marine Corps Air Station, the Barry M. Goldwater Air Force Range, the Yuma Territorial Prison State Park and the Yuma Crossing State Historical Park. Less than 1% of the land is set aside for the Cocopah Tribal Reservation.



The County has one primary population center clustered around Yuma, the county seat, located in the southwestern corner of the county and state along the I-8 and U.S. Highway 95 corridors. To the east, across the Gila mountains and over Telegraph Pass is Wellton, which serves as a commercial and service base for the unincorporated areas of Aztec, Dateland, Dome, Roll, and Tacna. Just south of the city of Yuma, along the Highway 95 corridor lays the incorporated cities of Somerton and San Luis. The Cocopah East and West Reservations straddle the highway and unincorporated Gadsden lies between the two incorporated municipalities. This presents a significant efficiency for delivery of services to geographically clustered populations of citizens. The economy of the County, especially the Wellton and San Luis-Somerton areas, has historically been heavily dependent on the produce agriculture industry, especially the fresh produce and citrus industries. Seasonal tourism is recognized as a major economic development component for the region, especially in the rapidly growing Foothills area east of Yuma and stretching out to Wellton. In the eastern portion of the County, which has deep roots in ranching and agriculture, there is an emerging retirement community developing, as well as expansion into the energy production arena.

Revenues derived from the state transaction privilege and severance tax have shown a steady, if modest, growth over the past 5 years. Municipal property tax rates within all but the City of Yuma are zero, with Yuma having a property tax rate of only 1.86 mils. School districts across the county are responsible for the largest portion of property taxes, ranging from a low of 6.5 mils in Wellton, to a high of 8.2 mils in San Luis. The county also has an excise tax which has shown steady and significant growth over the last 5 years. Sales tax revenues have also shown steady growth.

Agriculture, seasonal tourism, the military and international trade are the major economic drivers for Yuma County and its cities and towns. High-speed telecom is essential to protect and grow all of these local economic sectors and to provide for competitive positioning for Yuma County in the present and future.

What follows is a description of the main communities in Yuma County. It should be noted that there are an additional 59,000 people residing in the unincorporated areas of Yuma County.

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<sup>1</sup> AZ Dept. of Economic Security Population Statistics Unit

## 6.2 SAN LUIS

Strategically located on the international border with Mexico, San Luis is a rapidly growing city with tremendous potential to become a light manufacturing, distribution and retail center. The high unemployment rate (65.1% for 2002<sup>2</sup>) derives, in part, from the seasonal nature of the citrus and fresh produce agriculture industries in both Yuma County and in neighboring California. San Luis has an active economic development effort in place. It has a significant amount of available land, is well-situated on the Highway 95 corridor and Mexico border and can thus accommodate industrial development. A planned major increase in the size of the international Port of Entry will present major economic stimulus potential for this predominately Hispanic community.



The median household income (year 2000 data) is listed at \$22,966, below the state average. The average cost of single family housing is considered well below the state average and is determined to be \$69,600.<sup>3</sup> An interesting observation is that the percentage of rental properties vs. owner-occupied properties for San Luis is below the state average, indicating a significant degree of home-ownership. The 2002 unemployment estimate of 65.1% represents a decrease from almost 70% in 2000<sup>4</sup> and is a positive growth potential indicator. This is a young community, with the average age listed as 25.8 years. It also has a very high percentage of foreign-born residents, 49.1%<sup>5</sup>, a rate that is above the state average.

There is no city property tax rate, city revenues deriving from taxable sales, which have more than doubled between 1990 and 2002. New building permits have also skyrocketed, from 240 in 1996 to 546 in 2002. The single weakness identified in this community is a degree of political uncertainty which restrains it from capturing significant opportunities that present themselves, including development of advanced technology applications in city hall and placement of a digital Central Office for broadband telecommunications on the drawing board for the incumbent local exchange carrier. This community currently underutilizes technology, but has tremendous potential to reap considerable economic advantage from existing and emerging applications. Affordable, reliable broadband access is key to this community's advancement.

## 6.3 SOMERTON

Located on the Highway 95 corridor between the Mexico border and the City of Yuma, Somerton is well-positioned to take advantage of significant residential and commercial growth. While the average household income estimates for Somerton are below those found in nearby Yuma, the cost of housing remains at an attainable, or nearly attainable, level. Conversations with the city manager indicate that the residents of this community place a value on computers and access to the internet, making the financial sacrifices needed to ensure that their children have access to technology at home as well as at school. The City of Somerton is in expansion mode, having recently completed an annexation that doubles its geographic base with plans to pursue additional annexations in the future. Somerton currently has a very modest retail base,

<sup>2</sup> AZ Department of Economic Security

<sup>3</sup> U.S. Department of Housing and Urban Development

<sup>4</sup> AZ Department of Economic Security

<sup>5</sup> 2000 Census data



with significant employment coming from the public and non-profit sectors. Like its neighbor to the south, San Luis, this community has experienced rapid growth, with an assessed valuation almost tripling in the period between 1990 and 2002<sup>6</sup>. There is no city property tax, making property taxes among the lowest in the state.



Somerton's economic indicators are very similar to those seen in San Luis, with the median household income considered to be below the state average (\$26,544) and the median house value of \$68,600 significantly below the state average.<sup>7</sup> There is also a high percentage of owner-occupied housing in Somerton, above the state average. Unemployment remains well above the state average (2002 estimates at 43%)

but is showing a decrease since 2000. Foreign-born residents make up almost 50% of the population, with the majority of those from Latin America. Educational attainment levels are significantly below the Arizona state average, with an estimated 5.5% of residents holding a bachelor's degree or higher.<sup>8</sup>

Current budget restraints keep Somerton from making strategic investments in information technology software and government applications, but the administration is well-aware of the importance of upgrading their communications network and investing in cost and labor-saving technologies. As Somerton continues to grow, both geographically as well as economically, such IT support systems will become more critical for planning, service delivery and monitoring purposes.

#### 6.4 WELLTON



Wellton has roots in the railroad era, serving as a water station for both the Southern Pacific Railroad and the Butterfield Overland Stage. That history gives the town its name (Well Town, shortened over time to Wellton). The community was founded in 1878 but was not incorporated until almost a century later, in 1970. Today, the community is growing into a winter visitor resort and retirement community. Recent additions of a golf course, new

housing options, RV parks and potential development of an oil refinery near Tacna are all significant economic development opportunities for this anchor community in eastern Yuma County, along the I-8 corridor. A recently opened planned unit development with 500 lots available had such a positive response (300 lots sold within the first 3 months of operations), that phased plans to develop three more PUDs for a total of 1500 additional lots have been stepped up from a three-phase strategy to a single effort.

In contrast to the cities south of Yuma and closer to the international border with Mexico, Wellton has a median resident age of 46.9<sup>9</sup> which is reflective of its status as a growing retirement community and significantly above the state average. Wellton shares similar median household income levels and median house values with the rest of Yuma County, \$27,045 and \$77,800 respectively for year 2000.<sup>10</sup> The percentage of properties being rented, as opposed to

<sup>6</sup> AZ Tax Research Foundation

<sup>7</sup> U. S. Department of Housing and Urban Development

<sup>8</sup> [www.city-data.com](http://www.city-data.com)

<sup>9</sup> Ibid.

<sup>10</sup> U.S. Department of Housing and Urban Development



owner occupied is also very low. Wellton also has an unemployment rate, 22.7%,<sup>11</sup> that is lower than its neighbors to the south, but still exceeds the state average for Arizona. Wellton has no municipal property tax. Assessed valuation of property has shown a steady increase from 1990 to 2002, and taxable sales have grown steadily in that same time frame.<sup>12</sup> Roughly one-fifth of the population in Wellton are foreign-born, a considerable difference from the border communities of San Luis and Somerton.

With a growing retirement population, there is a growing service sector in Wellton. Strong citizen sentiment identifies a desire for more restaurants and more variety, as well as more retail opportunity. Even though the median age in Wellton and the surrounding area is much higher than the southwestern reaches of Yuma County, it is a population that understands, and embraces new technology. A local bank manager indicated that she estimates 80% of the bank's customers are on-line and use electronic banking services. The local library points out that, during the winter visitor season, lines to access the library's public computer terminals can run ten deep or more. The local developer has implied that plans for the development currently on the drawing board will incorporate broadband access to the curb, and there is strong interest in accessing the newly installed wireless system that serves town hall and several other government buildings in Wellton.

The town administrative staff is developing a keen awareness of the power of broadband access and technology, and plans to explore how the budget can accommodate needed hardware and software upgrades in the near term. Staff recognizes the challenges of not having on-site technical support staff, and there is some interest in how those needs might be met through some type of arrangement with the other communities and the county. This tranquil little community is on the threshold of a major growth spurt, with the demand for information technology access a significant by-product of that growth and development.

## 6.5 CITY OF YUMA

The City of Yuma serves as the primary population, economic, trade and retail center for Yuma County as well as being the county seat. With its European historical roots stretching back to the 1779 establishment of two Spanish missions, Yuma's permanent European settlement began in 1850 when an actual community was launched as a stop over point for travelers to California. The compound was first named Colorado City for its proximity to the mighty Colorado River, and then known as Arizona City. It was finally named Yuma, a reference to the native peoples in the area, in 1873. The area experienced considerable growth and was incorporated as a city in 1914.



Government provides a major source of employment at the Marine Corps Air Station, Yuma Proving Grounds, Yuma County, the City of Yuma and the Yuma school districts. The service sector is the dominant employment category, accounting for almost 87% of non-farm employment in Yuma.<sup>13</sup> Agriculture and related industries provide an important source of

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<sup>11</sup> Arizona Dept. of Economic Security

<sup>12</sup> AZ Department of Revenue

<sup>13</sup> AZ Department of Economic Security

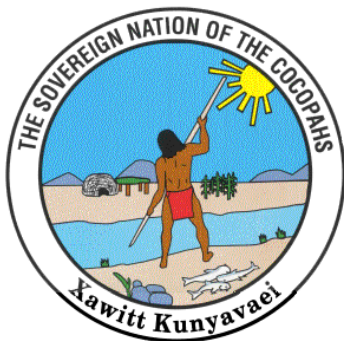
employment and revenue for Yuma. The 2002 unemployment rate was determined to be 16.2%, the lowest in Yuma County, but still well above the Arizona state average of 5.8%.<sup>14</sup> There is a much larger variation in the average cost of housing in Yuma than found elsewhere in the county, ranging from \$70,000 to the low \$100,000s with the 2000 median value of a single family house set at \$85,300. Median household income for 2000 was estimated at \$35,374, making it the highest in Yuma County. Like the outlying areas of the county, the City of Yuma has witnessed exponential growth since the early 1990's, more than doubling its taxable sales and assessed valuation.<sup>15</sup>

The city has embarked upon an ambitious effort to reestablish a vibrant downtown and reclaim its waterfront heritage. The downtown plaza area has seen recent efforts to upgrade and reinvigorate a blend of retail, arts and culture, and entertainment. The city administration is willing to make a dollar-for-dollar match to redevelop the waterfront and neighboring downtown. Given the rich history and substantial architectural variety, there is an enormous opportunity for economic development to benefit the savvy investor, city and citizens.

This municipal enlightened self-interest is further evidenced by strategic investments in civic infrastructure, including a recently constructed municipal center building and citywide development of a fiber optic communications backbone for such civic amenities as smart highways and traffic demand controlled, computer coordinated signal lights. Supported by partners such as the Greater Yuma Economic Development Corporation and the Yuma Chamber of Commerce, this is a community that is clearly ready to invest in itself and prepare to capture considerable economic potential in the very near future. Broadband access and advanced technology is viewed as a critical tool in assisting the city, its partners and its residents in accomplishing those strategic goals and objectives for an exciting and limitless future.

## 6.6 COCOPAH TRIBAL NATION

A geographically dispersed, yet small reservation, the Cocopah Tribal Nation has developed a clear understanding of the importance of partnering with its local government neighbors and marketing to a growing number of winter visitors. Within nearby governmental circles, the tribal administration has a reputation giving back to the community, boundaries. Recent activities across international borders the Cucupah in the San Luis Mexico and Baja, California.<sup>16</sup> newly constructed Cocopah south of Yuma, and the golf on the western border of progress in incorporating The Cocopah Tribe has also lowering its unemployment rate from 37.5% in 1990 to 18.7% in 2002.<sup>17</sup> This underserved market is just beginning to expand its demand for access to technology, first through its communications needs for the new casino, and secondarily because of a desire to meet the needs of its winter visitors to the golf resort on the north reservation for broadband access. The



<sup>14</sup> ibid.

<sup>15</sup> AZ Department of Revenue

<sup>16</sup> March 8, 2004 Yuma Sun

<sup>17</sup> AZ Department of Economic Security

tribal administration also has direct knowledge and experience within the field of information technology and understands the importance of connectedness to the future of the tribe. Like the rest of the communities in Yuma County, the Cocopah Tribal Nation will be a key customer for advanced technology and broadband access in the not too distant future.

## 7.0 INFRASTRUCTURE INVENTORY

### 7.1 INCUMBENT LOCAL EXCHANGE CARRIERS

#### 7.1.1 Qwest Communications International

Qwest is the local telephone company (ILEC) for most of Yuma County. Qwest services are available in the following Yuma County communities: Roll, San Luis, Somerton, Wellton, Yuma, Gadsden, and Tacna. Aside from required disclosures, Qwest provides no summary document of its broadband connectivity services by location, so the following information was assembled from published sources and comments from communications with Qwest staff members.

Qwest provides ATM connectivity in the city of Yuma. ATM connectivity (but not IMA) may also be available in most other Qwest-served locations in Yuma County to users willing to pay transport costs. Qwest's ATM disclosure notes:

QWEST now supports four UNI physical connections with the maximum bandwidths of 1.544 Mbit/s (DS1), 44.736 Mbit/s (DS-3), 155.520 Mbit/s (OC-3), and 622.08 Mbit/s (OC-12). ...Qwest also supports IMA (Inverse Multiplexing over ATM) access speeds 3.088, 4.632, 6.176, 7.72, 9.264, 10.808, or 12.352 Mbit/s.

...ATM Service Points are geographic locations, designated by QWEST, as entry points into the QWEST ATM Service Network. ...Wire Centers not listed as ATM Service Points are still accessible using the Private Line Tariff. Mileage and other construction charges may apply.  
<http://www.qwest.com/disclosures/netdisclosure400/news.html>

Qwest maintains a single frame relay switch in Yuma County that serves the following areas: Fortuna, Somerton, Wellton, and Yuma SE. No information on bandwidth capacity (or lack of capacity) is published. A complete list of Qwest Frame Relay switches and the Qwest offices they serve is at [http://www.qwest.com/disclosures/netdisclosure401/az\\_data.html](http://www.qwest.com/disclosures/netdisclosure401/az_data.html).

Recently, Qwest announced the expansion of availability of its DSL services in several rural markets in Arizona. Its Yuma County DSL service areas include (by switch location): Somerton, Yuma Main, Yuma Fortuna, Yuma SE. Qwest is also considering the provision of DSL service in Wellton in 2004 and in selected areas of San Luis by remote from Somerton.

Qwest has begun an initiative to work closely with communities presenting petitions for DSL service and acknowledges an increased interest in implementing innovative low-cost DSL remote service in selected locations. The company is testing a combo card to run DSL over pair-gain line. Also, in areas near where Qwest DSL is available, if 60-75 people sign a petition within a development, Qwest will consider putting in a plan for a remote.

In December, 2003, Qwest received unanimous approval of its 271 application to reenter the long distance business in Arizona. A 2001 Goldwater Institute Study of the potential effects of Qwest's re-entry in to the Arizona long distance business noted that there might be a significant benefit for school districts in the state. It predicted that smaller school districts, "which have proportionately higher expenditures than larger districts," would benefit disproportionately, "saving millions of dollars" [statewide]. Estimating the anticipated savings to be approximately 15% (based on the experience of other states) the report added,

Ultimately, anticipated price reductions in telecom services may be overshadowed by more dramatic reductions in the price of broadband internet access. Thus we can expect 271 relief to

impact not only the cost of telecommunications services, an important component of educational overhead expenses, but also the cost of providing schools high speed internet access.

[p.29, "The Economic Effects of Increasing Competition in Long Distance Telecommunication Services in Arizona, David Sosa, Analysis Group/Economics; Arizona Issue Analysis 166; November, 2001; Goldwater Institute, <http://www.goldwaterinstitute.org/pdf/materials/15.pdf> ]

At a recent meeting with local government representatives in another rural Arizona county, Qwest representatives -- without making any specific commitments -- responded to a question about service availability in a rural, low growth location with comments suggesting that the 271 decision made the potential for service improvement in Qwest's rural Arizona locations more likely.

Qwest Arizona President Pat Quinn visited Yuma in February 2004 and revealed the following information about Qwest's services in the county:

- As of March 1, Qwest will be providing cell phone service in Yuma County via the Sprint network. Qwest will maintain sales, billing, and customer service for its cell users on the service, which will share Sprint's coverage area.
- "It's doubtful" that Qwest will open a business office in Yuma. The company has a local facility with 56 employees, including three managers with a combined 100 years of experience.
- Qwest has hired one person whose job it will be to handle service and sales in the Yuma area. This employee is based in Yuma.

[Source: Yuma Sun, [http://yumasun.com/artman/publish/articles/story\\_9767.shtml](http://yumasun.com/artman/publish/articles/story_9767.shtml) ]

According to Qwest marketing materials, since 1998, Qwest has spent nearly \$2.9 billion to build and upgrade a state-of-the-art communications network in Arizona, raising the sum of its total investment in Arizona's infrastructure to almost \$6 billion. The Qwest charitable foundation has contributed \$5.7 million to Arizona charitable and community organizations since 1998.

General information about Qwest's Arizona offerings can be found at ArizonaTele.com website (<http://www.arizonatele.com/cgi-bin/profile.cgi?id=214>) or on the Qwest corporate website <http://www.qwest.com/>.

A recent Qwest brochure titled "Qwest's Continued Commitment to Our Customers -- to Our Employees -- to Our Competitors -- to Arizona" can be found in Appendix J. The brochure includes key contact information (mail address, phone, e-mail) for the President and eight other executives of Qwest Arizona.

## 7.2 CABLE TELEVISION/WIRELESS/ISP PROVIDERS

### 7.2.1 Arizona Educational Network (AZEdNet)

The Arizona Educational Network is a private network created by educators for educators, owned and operated by Portable Practical Educational Preparation, Inc. (PPEP) a statewide Charter school in Arizona. Arizona Educational Network (AZEdNet) is a statewide network

originally funded by the Arizona Department of Education in 1999, and designed to provide a one-stop solution for secure, filtered (Child Information Protection Act - CIPA compliant) high-speed internet access for educational institutions. AZEdNet converted to a fee-based service on January 1, 2002. The network currently provides internet access, e-mail, web content filtering and hosting to numerous school districts, charter schools, and businesses throughout the state.

AZEdNet is a statewide private network originally designed to provide a secure means for schools to submit student-level data to the Arizona Department of Education. The service includes CIPA compliant web content filtering for participating schools. Partners include the Arizona Department of Education, Cisco, Alpha Communications, Cable and Wireless, Qwest, Ensynch, and Cox.

#### *Current Infrastructure*

AZEdNet is a reseller, providing services from its partner entities which may include DSL, or digital connectivity from 56K to T-1. They currently serve their two charter schools in San Luis and Somerton with T-1s.

#### *Future Plans*

AZEdNet projects the addition of a hub in Yuma in June 2004, with a future hub planned for Casa Grande.

*Contact: Rick Brow*

520.294.6997 x2019

<http://azednet.org/>

## **7.2.2 Adelphia Communications**

Adelphia Communications is the primary cable television operator in Yuma County with a network that spans San Luis to the south, the City of Yuma to the north and Telegraph Hill to the east. The company offers cable modem internet data service to San Luis, Somerton and the City of Yuma, including the Marine Corps Air Station and Yuma Army Proving Grounds. Adelphia is providing data service in San Luis to the Gadsden School District with two strands to the each school. It is building an intranet for the Crane School Distract. Adelphia has obtained multiple bulk agreements with RV parks and mobile home parks to service the winter "Snowbirds." In addition, the northern portion of the Cocopah Indian Reservation is served by Adelphia. Data is the fastest growing segment of the company's business.

#### *Current Infrastructure*

Adelphia's network consists of an 860 MHz fiber backbone with coax used for the last mile. Adelphia and Level 3 are cooperating in building a fiber backbone across the United States. Right now data is sent via an OC-3 from Los Angeles to Yuma. The fiber/coax network started with 1500 homes to the node; however, the company will be decreasing this ratio to an optimum of 500 homes to the node via optical node splitters as demand builds. Adelphia built an intranet for the City of Yuma with fiber to every city building. The medical center has leased 12 strands of fiber and the school district has also leased fiber from Adelphia.

#### *Future Plans*

Adelphia is currently making plans to launch HDTV, VOD and DVR technology with 2004. Telephony services should be available 2005.



*Products and Pricing*

The internet data products offered by Adelphia are branded as *Power Link* or *Power Link Premier*. Power Link has speeds of up to 3 Mbps/356Kbps (downstream/upstream) for \$42.95 with cable video service or \$54.95 without. Power Link Premier has bandwidth speeds of up to 4 Mbps/512Kbps (downstream/upstream) for \$79.95 with video and \$91.95 without. The modem is leased for an additional \$3.00 per month. Bundle packages of video/data services are available with cost breaks depending upon number of premium pay channels desired by the customer.

Contact: Ricky Rinehart

928.329.9723

[ricky.rinehart@adelphia.com](mailto:ricky.rinehart@adelphia.com)

[www.adelphia.com](http://www.adelphia.com)

### 7.2.3 Beamspeed

Beamspeed is a wireless internet service provider currently serving all of Yuma County west of Telegraph Hill, and the portion of Mexico bordering San Luis. Because Beamspeed uses 2.5 GHz licensed spectrum, there is no interference and the MMDS (Multichannel Multipoint Distribution Service)<sup>18</sup> signal can transmit through trees and buildings.

*Current Infrastructure*

The MMDS signal is transmitted through base stations in Winter Haven (on the cell tower with the strobe), Yuma (Crescent Center) and San Luis (on the border at RL Jones Trucking). These base stations transmit a signal in a 20 mile radius pattern meaning that the total coverage area currently includes all of Yuma County west of Telegraph Hill.

*Future Plans*

Beamspeed is in the process of installing a fourth base station on the top of Telegraph Hill that will cover a 30 mile radius to reach communities (including Wellton) east of the City of Yuma.

*Products and Pricing*

Beamspeed offers two tiers bandwidth speed: Tier 1 has a burstable downstream speed of 756 Kbps and upstream of 128 Kbps for a \$99.95 set up fee and \$59.95 monthly fee; Tier 2 has burstable speed of 1.544 Mbps downstream and 200 Kbps upstream for \$199.95 set up fee and \$89.95 per month.

Contact: Philip Merrill

928.317.6866

[philipcmerrill@beamspeed.net](mailto:philipcmerrill@beamspeed.net)

[www.beamspeed.net](http://www.beamspeed.net)

### 7.2.4 C2i2

C2i2 offers dial-up internet services in Yuma, Somerton and Wellton. C2i2 is also a reseller of DSL service in Yuma only. It does not directly provision services but has relationships for DSL

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<sup>18</sup> See Glossary in Appendix E.

broadband sales with DakotaCom.net utilizing Qwest DSL and New Edge Network's national infrastructure. This infrastructure includes Cisco carrier-class routers in over 30 major metropolitan markets, DSL in 600 central offices serving 350 small to mid-sized cities nationwide.

#### *Products and Pricing*

Residential dial up accounts start at \$19.95 per month with discounts available for special accounts (Military, Senior, Student, Education). Business accounts start at \$28.95 with a \$40 one-time set up fee. DSL service pricing varies by customer location and level of service desired.

*Contact: Patricia Jenne, Customer Service*

1.888.932.2242

[c2i2mgr@c2i2.com](mailto:c2i2mgr@c2i2.com)

[www.c2i2.com](http://www.c2i2.com)

### **7.2.5 Cybertrails**

Cybertrails is headquartered in Phoenix and offers dial-up service in the City of Yuma, San Luis, Somerton and Wellton. Redundancy is guaranteed through fiber connections with Cox, Qwest and ELI, and backbone providers UUNET, Broadwing and Global Crossing.

#### *Current Infrastructure*

Point-to-point and frame relay is offered to the business sector and is available to residential households as well. No DSL, ISDN or wireless service is currently being offered in Yuma County.

#### *Products and Pricing*

Dial up pricing is \$21.95 per month for statewide access with discounts given to Senior Citizens, students and educators.

*Contact: Paul Fox*

623.434.6081

[paul.fox@cybertrails.net](mailto:paul.fox@cybertrails.net)

[www.cybertrails.com](http://www.cybertrails.com)

### **7.2.6 Digitaldune Networks**



Digitaldune Networks is a dial-up, wireless and DSL provider of data services to residential and business customers in Yuma County. It is owned by Fisher Wireless Services, which is headquartered in Blythe, California. Digitaldune, however, has operated out of its local Yuma office since 1996.

#### *Current Infrastructure*

The company owns an unlicensed, 2.4 GHz wireless system in the City of Yuma. The wireless system with multiple access points is located throughout the City of Yuma, with plans to expand the coverage area in the near future. DSL is offered through Digitaldune's partnership with New Edge Networks. Dial up service is available throughout the 928 area code.



### *Products and Pricing*

As mentioned above, dial-up internet service is available throughout the county in the 928 area code with unmetered service starting at \$19.95 per month.

Wireless service is offered primarily to the business community and is priced at \$50, \$75 and \$125 for burstable rates of 128Kbps, 256Kbps and 1024Kbps respectively. Dedicated point-to-point T-1 speed lines are also available on an individual case basis. There is an installation fee of \$250 for wireless service and the option to lease or buy the station adapter. Business Class DSL can be obtained in speeds ranging from 192k to 1.1Mbps SDSL and 144K IDSL. The monthly fees start at \$79.95 and can go up to \$210.95 per month.

Contact: James Fredy, Sales Manager

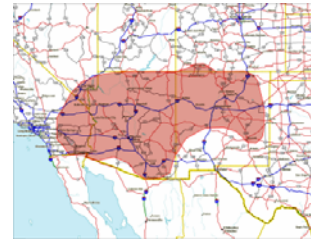
928.344.1110

[jfredy@digitaldune.net](mailto:jfredy@digitaldune.net)

[www.digitaldune.net](http://www.digitaldune.net)

## **7.2.7 Telespectra**

TeleSpectra LLC was formed in 1999 to provide network services, specifically, broadband transport and access services for business in the rural Southwest, including the states of Arizona, New Mexico, Nevada, Colorado and California. Although the current company was originally formed in 1999 it is comprised of merged and acquired assets from companies such as MCI/American Television Relay who have been operating in the rural southwest for nearly 50 years. Overall, TeleSpectra can be characterized as a telecommunications service provider specializing in the design, build out, installation and maintenance of wireless microwave systems offering voice, video, data and broadband network services. Telespectra partnered with Beamspeed, the local video provider (see above) to apply for a RUS grant. This \$1.3 million Community-Connect Broadband Grant was recently awarded to the partnership by the Rural Utilities Service to deliver high speed internet access to Wellton, Arizona, a rural town with a population of under 2000 people. "The grant will provide funding for the implementation of a broadband telecommunications network...In addition, the network will provide Wellton with broadband connectivity to Yuma, Arizona." The full news release can be found at



<http://www.telespectra.com/TeleSpectra%20Press%20Release%205-20-03.pdf>

### *Current Infrastructure*

Telespectra's network across the southwest United States includes towers, points-of-presence (POPs), and a licensed frequency microwave backbone. In Arizona, the company offers Hi-Cap (T-1 and up) services to over 100 locations and high-speed wireless internet to Wellton and the Scottsdale Airpark area. The network is backhauled to Phoenix through a 3 x DS-3 microwave system.

### *Future Plans*

The wireless High-Speed Internet Service will be expanded from Wellton to Yuma in 2004, offering service initially to over 75% of the City. Other areas the company is expanding to include Williams, Rio Rico and Springerville. Telespectra does not currently offer VoIP but might, in the future, partner with other companies to offer this service with Telespectra contributing the connection to the internet as its part of the partnership.

*Products and Pricing*

Telespectra offers high speed internet services, transport and access products and video services. Pricing starts at \$45.95 per month for residential customers and \$85.95 per month for business customers. In addition, minimum installation and activation charges are assessed starting at \$50 for residential and \$200 for business customers.

*Contact: Daman Wood, Sr Account Manager*

602.648.5843

[dwood@telespectra.com](mailto:dwood@telespectra.com)

[www.telespectra.com](http://www.telespectra.com)

### 7.2.8 The River



The River Internet Access Company, headquartered in Tucson, has been in business since 1995. Through acquisitions of Sierra Internet, Innovative Systems Design, First Internet Alliance, gila.net, fiaaz.net, oz.net, Bainbridge.net, and Serv.net, The River has grown to be one of the country's largest independent ISPs and maintains a local presence with over 20,000 customers in Arizona and Washington. It offers nationwide dialup access at no extra cost, and worldwide access is available through the iPass network.

The River provides internet service to customers in the City of Yuma as well as numerous cities in Gila and Pinal Counties. In addition, The River has large concentrations of customers in Tucson, Phoenix, Sierra Vista, and Nogales in Arizona and in Seattle, Washington.

*Current Infrastructure*

The River has a very robust regional network consisting of T-1s, multiple DS-3s, a 100 Mbps Ethernet and an OC-3. This network provides for redundancy, connecting facilities in Tucson, Seattle and Phoenix through a ring of private DS-3 circuits. The OC-3 into The River's Tucson Point-of-Presence (POP) is split into 3 DS-3s connecting to the Qwest ATM/DSL network, the Qwest Frame Relay network and the third, a private DS-3, connecting The River's facilities in Tucson and Phoenix. A diagram of this network can be seen in Appendix H.

Their Seattle facility is also home to a state-of-the-art server farm, developed to replace separate Email, WWW (Web), DNS and Authentication servers with a fully-redundant, highly-available cluster of servers. This server farm consists of many individual servers, with fully redundant load-balancing and routing equipment, all networked to an industrial-grade EMC Celerra mass-storage subsystem (based on their "five-nines" Symmetrix platform, used by financial institutions worldwide) for the most robust data integrity, availability, and redundancy available.

Through partnerships with Qwest, New Edge Networks and Verizon, The River provides DSL service throughout large parts of its service area. It offers both Qwest and New Edge Networks DSL in Yuma. Qwest is generally a cheaper option and is popular with residential and small office/home office (SOHO) customers, while New Edge offers a larger availability area and more choices for business customers.

*Future Plans*

The River is aggressively expanding its DSL services, focusing on areas where Qwest is installing new DSLAMs into central offices. In the past year they have added national dial-up

access and a sophisticated Spam and virus filtering service. The River has recently added satellite access and a “dial-up accelerator” package to better serve markets where broadband options are limited.

### *Products and Pricing*

The River offers dial-up or ISDN internet access (starting at \$22.95 per month for nationwide service). The Company partners with New Edge Networks, Qwest and Verizon to offer DSL in the following towns:

- Yuma
- Sierra Vista
- Tucson/Green Valley
- Prescott
- Western Washington
- Phoenix
- Nogales
- Flagstaff
- Seattle

Most dialup, ISDN, and DSL service plans include 5 email addresses and spam/virus filtering. Dialup Accelerator is available as an option. Frame Relay is available in most markets at speeds of 56kbps to 1.536Mbps (T-1). Web hosting, static IP addresses, domain email spooling, co-location and data transit without co-location are also available. Technical support is 24x7 and is included for free on most service plans.

DSL speeds offered are 192Kbps, 256Kbps, 384Kbps and 768Kbps. DSL pricing ranges from \$35.95 to \$80.00 per month (including DSL provider fees) with set up charges ranging from \$0 to \$349. Residential rates are on the lower end of the scale and business rates on the upper end. Satellite service is available in all areas.

*Contact: Marcus Needham, Vice President Development*

1.877.887.4837

[marcus@theriver.com](mailto:marcus@theriver.com)

[www.theriver.com](http://www.theriver.com)

The following tables summarize the cable television providers showing markets served, product offerings and pricing.

### **LOCAL INFRASTRUCTURE PROVIDERS**

<b>Provider</b>	<b>Markets</b>	<b>Products</b>
<b>1</b> Adelphia	San Luis, Somerton, Yuma, MCAS, US Army Proving Ground	Cable Modem
<b>2</b> AZEdNet	San Luis, Somerton (Yuma-Future)	T-1
<b>3</b> Beamspeed	San Luis, Somerton, Yuma (Wellton-Future)	Wireless
<b>4</b> C2i2	Somerton, Wellton, Yuma	Dial Up, DSL (Yuma)
<b>5</b> Cybertrails	San Luis, Somerton, Wellton, Yuma	Dial Up
<b>6</b> Digitaldune	San Luis, Somerton, Wellton, Yuma	Dial Up, DSL, Wireless (Yuma)
<b>7</b> Qwest	San Luis, Somerton, Wellton, Yuma	Dial Up, DSL (Yuma, Somerton)
<b>8</b> Telespectra	Wellton (Yuma in 2004)	Wireless
<b>9</b> The River	Yuma	Dial Up, DSL

## INFRASTRUCTURE OPTIONS

Community	Video	Cable Modem	DSL	Wireless	Dial Up	T-1
<b>San Luis</b>	Adelphia	Adelphia			Cybertrails, Digitaldune, Qwest	AZEdNet
<b>Somerton</b>	Adelphia	Adelphia	Qwest, Digitaldune	Beamspeed	C2i2, Cybertrails, Digitaldune, Qwest	AZEdNet
<b>Wellton</b>	Beamspeed			Telespectra	C2i2, Digitaldune, Qwest	
<b>Yuma</b>	Adelphia	Adelphia	C2i2, Digitaldune, Qwest, The River	Beamspeed, Digitaldune, Telespectra (future)	C2i2, Cybertrails, Digitaldune, Qwest, The River	AZEdNet (future)

## 8.0 NEEDS AND ASSETS ANALYSIS

**More and more, an adequate living standard depends on computer and phone access. Resident, Yuma County**

Community meetings were held in Yuma, Somerton, San Luis and Wellton to discuss and provide input for the development of the Community Telecom Assessments. In addition, the survey was posted in English and Spanish on the Yuma County web site.

The objective of these community meetings was to provide and collect:

- An overview stating the purpose of the State of Arizona's Community Telecom Assessments
- An outline of the telecom planning process
- Possible outcomes and impact to the community
- An opportunity to participate in the planning process
- Provide input as to community telecommunications priorities
- Data regarding the state of telecommunications services

Presentations used in the meetings can be found in Appendix A.

Team members conducted one-on-one interviews in as many cities/towns as feasible with people representing the government, medical, educational, library and business communities. In addition, American Research Interviewing, a survey research firm, called over 600 businesses in Yuma County resulting in 164 completed telecommunications surveys.

The project team feels that these meetings, the phone interviews and one-on-one interviews were a valuable part of the overall process. Information gained through these meetings and user survey questionnaires was used to establish a "demand-set" of telecommunications services for the area. Additionally, this information was used to help establish telecommunications networking priorities for the region. What the surveys indicate is that high-speed data service is present in all the communities studied to some extent. However, the service is not available to all areas of the county and affordability is an issue for many residents and businesses. Comments from the surveys indicate that fast, reliable data service is an important issue to public offices, private businesses and individuals in Yuma County and is an important element in managing growth.

### 8.1 TELECOM SURVEYS – QUANTITATIVE

#### 8.1.1 Survey Results

Through public meetings and telecom surveys, public, private and non-profit offices are saying that their primary telecommunications goal is to access greater bandwidth capacity over the next five years to support and improve their current work processes as well as future growth. Telecommunications surveys were distributed throughout the county via: the county's web site,

in all town/city halls, county complexes, economic development corporations, chambers of commerce, the Small Business Development Center, and the Yuma Private Industry Council. As mentioned above, public offices, libraries, educational institutions and medical institutions were interviewed and key businesses were contacted urging them to complete and send in the survey.

#### Surveys by City Grouping

Dateland	1
San Luis	39
Somerton	9
Yuma	239
Wellton	50
Library District	106
<b>Total</b>	<b>444</b>

#### Surveys By Sector

Public/Non Profit Sector	9
Private Sector	170
Home Office	6
Individuals	259
<b>TOTAL</b>	<b>444</b>

These efforts generated 444 surveys from the public and private sectors of the local economy as well as individuals. The library district created their own “short form” survey and distributed it in the libraries throughout the district. Unfortunately, there was no place on the form for the city to be filled in; however, from the content we can tell that the bulk of the surveys originated from San Luis and Yuma.

We are thrilled with the volume of responses from Yuma County. Residential surveys returned at 259 are 1% of total households in the county, a good return. Surveys from businesses totaled 185 or 7% of total businesses in the county (per the InfoUSA database<sup>19</sup>). It should be noted that the quantity of public surveys is understated due to the large number of public and non-profit sector one-on-one interviews with project team members.

The business response was even greater, when looking at the number of businesses given to the interview firm to call. This list of 652 did not include businesses in industries that typically do not have a need for high-speed data, such as beauty shops, T-shirt shops and restaurants. Using the more targeted database, 28% of businesses responded to the survey.

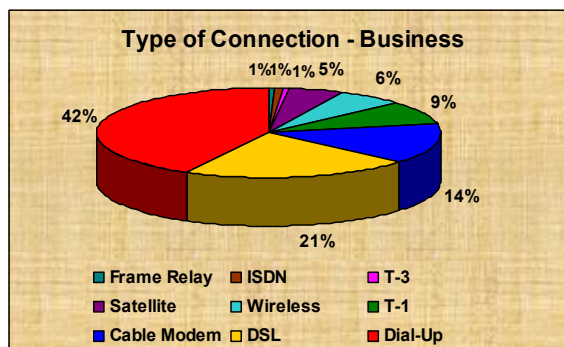
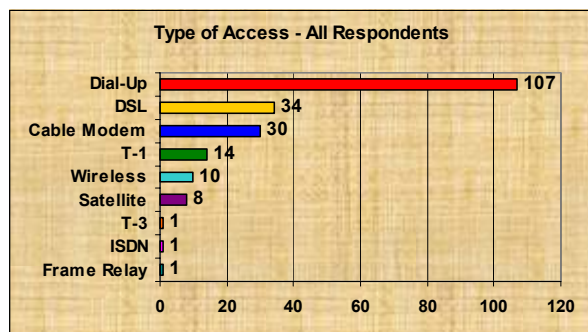
The chart below shows that, even though cable modem service is available throughout most of the county, the prevalent technology still being used is dial-up (52%) with DSL and cable modem a distant second and third (17% and 15% respectively). Residential surveys completed for this statistic (n=47) showed 85% respondents using dial-up and the remainder (7 surveys) using cable modem service. This is not surprising as the cost of service was much more critical for residential consumers in cities with lower income levels and for retirees.

“Why does high speed access have to be so costly? If the cost were less, it would be more accessible to more families.” *Resident, Yuma*

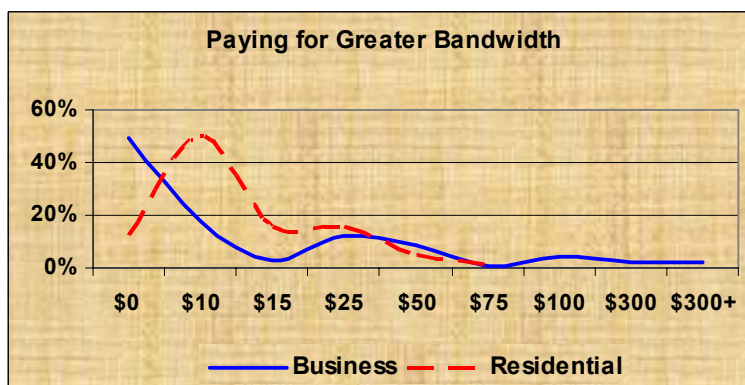
“I use the library computer because I can’t afford a computer. The only way to do homework is in the school or library.” *Individual*

<sup>19</sup> InfoUSA lists can be found at [http://www.listbazaar.com/cgi-bin/abicgi/abicgi.pl?bas\\_session=S42730867010015&bas\\_vendor=0&bas\\_type=LC&bas\\_page=999&bas\\_action=home](http://www.listbazaar.com/cgi-bin/abicgi/abicgi.pl?bas_session=S42730867010015&bas_vendor=0&bas_type=LC&bas_page=999&bas_action=home)

Businesses also followed the trend of primarily using dial up service, followed by DSL and cable modems. But, they also are more likely to either have higher speed service options such as T-1, T-3, satellite, frame relay or ISDN, if high-speed is critical to operating their business.



Of respondents (n=308) who said that they have internet access, 23% of the residential surveys said that internet access is critical versus 57% of businesses that said it is critical to their business operations.



To determine the true demand in Yuma County, we asked respondents how much extra they would be willing to pay for greater bandwidth (or faster speed). Household residents seem to not want to pay any more than \$10 extra per month for greater speed than the \$23 average they are paying now for dial-up service.

The business community's results (n=97) fell into three groups: those who would not pay anything or did not want additional bandwidth (49%); those willing to pay about \$25 (33%) and the nine companies that would pay \$75 or more extra per month for greater bandwidth (9%). These findings are in line with similar telecom studies conducted in the past. The businesses in this Yuma study are currently paying from \$10 to \$6000 monthly for internet access with an average of \$160 [\$86 per month excluding the two highest amounts noted of \$1000 and \$6000]. The most frequently stated amount (the mode) paid monthly was \$20.



### 8.1.2 Satisfaction with Service Providers

The following tables shows satisfaction values across respondents with a scale of 1.0 (Very Satisfied) to 5.0 (Very Dissatisfied). Interestingly most respondents fall in the “Satisfied” to “Neutral” range with their current service providers for local phone, long distance, cellular phone, cable television and internet service. Residential households ranking local phone service the highest and internet service lowest. Businesses ranked long distance first and cable TV last but all scores were very similar.

Service Provider	Residential	Business	ALL
Local Phone	2.1	2.0	2.0
Long Distance	2.3	1.7	1.9
Cellular	2.2	2.2	2.2
Cable TV	2.3	2.1	2.3
Internet Provider	2.4	1.9	2.0

If one looks at the same data sorting by city, the results are not much different with the scores in the *Satisfied* to *Neutral* range (2.0 – 3.0). San Luis has the most service issues with their cellular phone service. This is most likely due to the frequency interference from Mexico.

City	Local Phone	LD	Cell	Cable TV	ISP
San Luis	1.9	2.1	2.7	2.5	2.3
Somerton	2.4	2.4	2.3	1.8	2.3
Wellton	2.2	2.2	2.0	2.2	2.2
Yuma	2.0	1.8	2.2	2.2	1.9
<b>Total</b>	<b>2.0</b>	<b>1.9</b>	<b>2.2</b>	<b>2.3</b>	<b>2.0</b>

Yuma ranked their long distance service best as did Somerton with their cable television service. The internet service providers’ performance also centered around the *Satisfied* to *Neutral* range, whether the performance statistic is determined by residential or business markets or by city. This is somewhat surprising considering the many comments expressing dissatisfaction with internet service. A sampling of these comments can be found in Section 8.2.

### 8.1.3 Bandwidth Usage

Survey respondents showed interest in the qualities and applications of bandwidth usage as follows (ranked by number of responses):

Top 5 Residential	Top 5 Business	All Surveys
1. Faster Speed	1. Faster Speed	1. Faster Speed
2. E-Mail	2. E-Mail	2. E-Mail
3. Research/Surfing	3. Research/Surfing	3. Research/Surfing
4. High Speed Data Transfer	4. Video Arraignment	4. Video Conference
5. Voice over Internet	5. Video Conferencing	5. Video Arraignment



Almost 90% of all respondents who answered this section of the survey ranked “faster speed” as the most desired quality they required from their internet access provider. Email was the application used by 75% of all survey respondents and 63% used the internet for research or internet surfing. When the surveys were analyzed by city, the top three most used applications were the same across all cities: faster speed, email and research/surfing.

A full listing of attributes/applications desired, in priority order are:

Internet/Bandwidth Uses		
1. Faster Speed	6. Web Hosting	11. Training
2. E-Mail	7. Data Backup	12. Telehealth
3. Research/Surfing	8. Data Transfer	13. Telemedicine
4. Video Conferencing	9. Link Multiple Locations	14. Voice over Internet
5. Video Arraignment	10. Distance Learning	15. GIS Data Sharing

A table listing the application priorities for each city as well as breakouts by residential/business can be found in Appendix C.

## 8.2 TELECOM SURVEYS – QUALITATIVE

**“I just hear people complaining about slow speed. If it was faster, people wouldn’t complain.” *Farm Equipment Company, Yuma***

The citizens and business leaders in Yuma County spoke out forcefully about the current state of telecommunications where they live and work. These comments contribute greatly towards understanding current frustrations and future needs with regard to high-speed telecommunications access. Here are a few comments on the subject of current frustrations from the surveys:

“[The problem is] the speed and ties up our phone lines – we have a limited number of phone lines since we’re out in the County. That is, it takes too long to search or download.” *Agricultural Business, Yuma*

“It is not fast enough to download the info and it takes forever to bring up.”  
*Agricultural Business, Somerton*

“Would like faster, more reliable service.” *Packing Company, Yuma*

“It is not fast enough to go to web sites to do research for parts I need. When I have to find information about vehicles, I have to go home and do it on my cable internet.”  
*Aircraft Company, Yuma*

“It’s just slow. Everything is slow. It takes minutes to download pictures – a lot of waiting.” *Jewelry Store, Yuma*

"At home we do genealogy research. Also do on-line searches for products (books/software) and travel. At work I order office supplies, code books and do code research. Our dial-up access through C2i2 is tedious and extremely slow. It is frustrating when we are doing research and have lost our connection to the site. Our dial up service is slow when there are several users on at the same time and the internet cannot be accessed at all, or getting "kicked off" when we are trying to access information. [We are] sometimes unable to access email to either receive or send." *Resident, Yuma*

Applications are what drive the need for high-speed access. The following are a few examples of how the respondents currently use their internet connections.

**[High Speed] It's our oxygen! NBC News, Yuma**

"For educational purposes including reference and research and for administrative purposes such as State and Federal reporting....We use Frame Relay T-1 for voice and data between all of our schools and to our voice and internet service providers...Our biggest issue is trying to get our enhanced 911 service approved." *Somerton School District*

"[We use the internet for] customer support, take orders over the internet, customer tracking research, communicating with sister companies and email. Some higher speed options are not available at certain locations; that tends to cause some problems. In the future, would use for data transmissions to multiple location sites and e-commerce." *Farm, Yuma*

"Direct connection to network for [sister branches]; includes looking for parts all over the US for customers, web site, some e-commerce. Use for training network in each store." *Motorcycle Dealer, Yuma*

"Real estate listings, email, web pages, open escrows, access tax records." *Realty Company, Yuma*

"Transfer documents easier, email faster, more training and lecturing." *High Tech Company, Yuma*

"Use high-speed internet to access web sites, INS, Department of Labor, information on health and wellness, OSA, IRS." *Manufacturing Company, Yuma*

"To retrieve authorizations for insurance; they submit insurance work to the labs to order glasses." *Vision Store, Yuma*

Two groups of Yuma County citizens with special technology needs are low income citizens and the large retiree population – both full time residents and *snowbirds*. The library district has bridged the 'digital divide' between those who can afford internet access and those either with very low income or fixed incomes and cannot afford neither a computer nor monthly access costs. The biggest beneficiaries of library access are the student population – both for homework assignments and for 'clean' entertainment.

"I use the library computer because I can't afford a computer. The only way to do homework is in the school or library." *Individual*

"I use the library computer to entertain myself with the music and games because I'm bored at home." *Individual*

I have no phone line. I use the library computer for email and research. The library's computers are fast and they never break. *Individual*

I use the library computer for internet and college work. Even though I have a computer at home, I am always in Wellton and I live in Roll. It is convenient for me to be able to use the Wellton library's computers. Thank you. *Student*

I use the library computer for email and research. I can find the information for my medicine and parents' illnesses on line. I can keep in touch with home with email. Have you thought about a donation jar for computer users? *Snowbird*

We are full time RV people. We email to maintain contact with our family and keep track of our finances. The library computers enable us to pay some bills and check our finances in a timely manner. Also correspond with family and friends in different states. We really appreciate being able to do so at the libraries. *RV/Snowbird*

We use the library for banking, shopping and to keep in touch with friends and family when away from home. The library is one of the main reasons we decided to make Wellton our winter home. *Snowbird*

I use the library's internet access for searches and voice relay phone calls because I'm nearly deaf. There is no phone port in my RV so this is the only way I can make phone calls. Often need computers searches – very important to me. *Retiree, Yuma*

I use the internet for banking, business, shopping, research and email. Now that I am retired, speed is not as important as a few years ago. I would pay a reasonable amount for an increase in speed. *Retiree, Yuma*

During the 2003 Iraqi War, soldiers at the military camps in Kuwait would either have to get up in the middle of the night to sign up for a spot on the internet or would have to wait four to eight hours during the day for 30 minutes of use. No matter what base you are stationed at, the base library is the soldier's connection to family and friends. The library district in Yuma County, as others across the world, supports our military.

"I use the library's internet access for personal email. Many military personnel are stationed in the vicinity. I know it helps me keep up morale and I'm sure that it helps maintain the morale of others who are far away from home." *MCAS Marine*

The library district noted that, "At each of our library locations, we use the internet for work and also we provide Yuma County residents internet access. We have 100+ computers in our District for the public to use for internet access and 70 staff computers. Internet access is vital to our offered services....We want to be able in the near future to tie all of our locations together with VoIP...We get our internet access through the Yuma Educational Consortium."

A full summary of survey results and comments by respondents are in Appendix C. A notebook of completed surveys organized by public entities, private businesses and individuals is available at the Yuma County offices.

### 8.3 PROJECTED MARKET DEVELOPMENT

The leading edge of the *Baby Boomer* generation<sup>20</sup> will start to retire within the next 4 to 7 years and this often quoted generation will continue to begin their retirements for the next 18 years. This phenomenon will impact Arizona and Yuma County as the Boomers look for warmth and a cost effective location for their retirement years. Along with the increased population will be increased demand for improved broadband access and other services.

Demand for applications and services will also be a function of software and equipment and, as long as reasonably priced capacity is available, applications and services should not be an issue. Future applications Yuma County will “grow” into include advanced voice services, video-conferencing, video arraignment, high-speed data transfers, Virtual Private Networks, transparent LAN services, electronic town hall meetings, electronic voting, and other applications not yet created.

Businesses located along the planned port authority corridor and along the major interstate will continually demand greater capacity at faster speeds and advanced telecommunications services, via wireline or wireless technology. A new generation of applications such as county security applications and e-government services needs to be deployed.

“I would use high-speed for data research, email, connect to out-of-town engineer, advertise our company better, have our own web site.”

*Precooler Business, Yuma*

“In the future might use connection for VPN connection and possibly web hosting.”

*Electrical Business, Yuma*

“Would use in the future to research products, equipment, trucks and shopping for tickets.” *Construction Company, Yuma*

There is still a portion of the population that has difficulty envisioning how higher-speed access will impact their lives. A big educational effort is needed both now and as more applications become available throughout the county. Bringing greater speed/bandwidth and applications to the county will require classes, seminars and marketing campaigns so that citizens and businesses can understand how internet and other high-speed applications can enrich their lives. Here are some comments from those that are not now able to see how higher-speed access and applications will impact them:

“I don’t know enough about it to know how I would use it.” *Produce Company, Yuma*

“I wouldn’t do anything different from what I do now.” *Dairy Farm, Yuma*

“It would just make everything faster...instant speed would be the best.”

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<sup>20</sup> The “Baby Boomer” generation is generally defined as those people born between 1946 and 1964.

*Agricultural Company, Yuma*

"More interested in saving time than anything." *Nursery, Yuma*

No particular advantages [to higher speed]. *Farm Service Company, Yuma*

I don't know much about high speed. *Heating Company, Yuma*

Don't have a clue what the difference would be [with faster speed]. *Bank, Yuma*

## 9.0 POTENTIAL REVENUE PROJECTIONS

### 9.1 METHODOLOGY TO DETERMINE POTENTIAL TELECOM MARKET

#### Revenue = Price x Demand

A revenue assessment is ostensibly very simple — one just needs to multiply price by demand to yield revenue. Price ranges are determined by looking at comparably priced services in the relevant city, county, in Phoenix and industry-wide.

#### Demand Estimates and Projections

The demand side of the equation is a little trickier. In order to aggregate the bandwidth needs of the County we need to know who will buy what demand of the various levels of bandwidth that might be offered.

One should note that we have categorized this bandwidth by *high*, *medium* and *low*. We have established these categories to recognize that what we consider high, medium and low today will have a totally different definition in ten years.

Our current definition is that “high” is 1.5 Mb/s or greater, “medium” is 512 Kb/s and “low” is 128-256 Kb/s. A telecom “think tank” study by Dr. Lawrence Vanston called *The Local Exchange Network in 2015* looks at a probable scenario for telecommunications in the future. His advisory board included input from Verizon, SBC, Bell Canada, BellSouth, Sprint and Qwest. The report suggests that, by the year 2015, “high” bandwidth will be 100 Megabits per second and above; “medium” will be 6-24 Mb/s and “low” will be 1.5 Mb/s and lower.<sup>21</sup>

<u>BW</u>	<u>Now</u>	<u>2015</u>
High	1.5 Mb+	100Mb+
Med	256-512Kb	24-50Mb
Low-Med	128Kb or less	1.5Mb or less

#### *Residential demand*

Population and household data estimates and projections for each community are based on U. S. Department of the Census (census 2000) and official State data sources.<sup>22</sup> A recent Northern Arizona University study, *Grand Canyon State Poll*, stated that 76% of the respondents have access to the internet.<sup>23</sup> The study also commented on the relationship between household income and internet access.

To be able to establish a “starting point” for internet access for each city, an index was created based on the relationship of each community’s median household income compared to the State of Arizona. This index then is used to interpolate an estimate of the percentage of households with internet access in each community. Since the Cocopah reservation is included in Somerton, each community’s percentage (of internet access users) is weighted by its number of households to yield an overall percentage of internet access for the total households. This percentage is increased over the ten-year period.

<sup>21</sup> Lawrence K. Vanston, Ph.D., *The Local Exchange Network in 2015*, Technology Futures, Inc., 2001.  
<http://www.tfi.com/pubs/2015.html>

<sup>22</sup> <http://www.de.state.az.us/links/economic/webpage/popweb/index.html>

<sup>23</sup> *Grand Canyon State Poll*, Northern Arizona University Social Research Laboratory, April 17, 2002.  
<http://www4.nau.edu/srl/News/04-17-02.pdf>

The bandwidth accessed by households is segmented into *Medium*, *Low*, and *Dial-Up* households so that the appropriate pricing can be applied to yield revenue projections. Bandwidth has not been designated by absolute demand (e.g. 256Kbps or 1.544Mbps) because we believe that bandwidth, over a ten-year period of time will become commodity-like similar to what has happened with the cellular telephone industry. As the cell phone industry matured, providers offered a greater demand of minutes for the same monthly fee to protect their revenue stream. Projections for *medium* and *low* residential bandwidth demand was estimated by the project team based on the existing infrastructure, discussions with existing providers, and industry-wide research, such as the *Technology Futures, Inc.* white paper.

#### *Public/Private/Nonprofit Demand*

This category includes the “big users” of large amounts of bandwidth; therefore we need more specific input from these potential bandwidth customers. A database of all the private and public businesses in the County, by municipality was developed (using *Dun & Bradstreet* primary data). A growth factor was assigned to each community based on the characteristics of the community (e.g. income level, broadband availability, historical growth rates, support of local government and community leaders). For example, the 2,614 entities in Yuma are projected to grow 4% per year as businesses spread east from California and southwest from Phoenix and broadband becomes more widespread.

Information collected from the telecom survey results, interviews with government, educational, medical, private business and bandwidth vendors was used to estimate what bandwidth businesses have now and will most likely need in the future. These quantitative results (bandwidth by category – high, medium, low) were then fed into the revenue model along with the up-to-date population projections, business growth and industry statistics customized to meet the specifics of the telecommunications environment Yuma County.

### **Demand Results**

The result of the above calculations is the projection of the number of households or firms buying various levels of bandwidth over the next ten years (see financial model in Appendix I). One should note that we are projecting that the “mix” of bandwidth will also change over the ten-year period. As greater bandwidth becomes available at affordable price points; dial-up access becomes almost obsolete.

## **9.2 PROJECTED MARKET (REVENUES)**

The primary issue with “take rates” or how many firms (or households) will buy a high-speed connection, is the pricing levels – how affordable the services are for the long term. We have assumed that pricing for public and private entities will start at rates currently being offered by the more competitively priced high-speed access providers in each of the communities. Over time, we are predicting that prices will *decrease* as either competition increases and/or the wholesale cost of the bandwidth decreases. By year 6, we assume that equipment fees will be included in the monthly service price.

Using the above assumptions for quantities bought and pricing schedules, the following table displays possible total high-speed revenue potential for the community clusters (amounts in thousands of dollars).

	Year 1	Year 3	Year 5	Year 10
<b>Yuma COUNTY</b>				
San Luis	\$ 178	\$ 450	\$ 647	\$ 831
Somerton	186	366	459	639
Wellton	135	194	209	235
Yuma	5,117	6,668	8,461	12,072
<b>TOTAL</b>	<b>\$5,617</b>	<b>\$7,677</b>	<b>\$9,776</b>	<b>\$13,777</b>

So what options does this information generate?

- 1) Private providers can insert the projected revenues into their cost models to determine whether or not they want to provide service in the county.
- 2) Community clusters and/or counties may, individually or jointly, put out a Request for Proposal that quantifies the revenues for the public entities as anchor tenants and potential revenue throughout the county.
- 3) The county may decide to build a backbone network in a portion of the county and, with the development of the cost structures for various technology options, could determine whether the investment in a telecommunications infrastructure makes sense.
- 4) This information could provide the impetus for incumbent providers (telephone, cable, ISPs) to enhance their facilities and services provided.

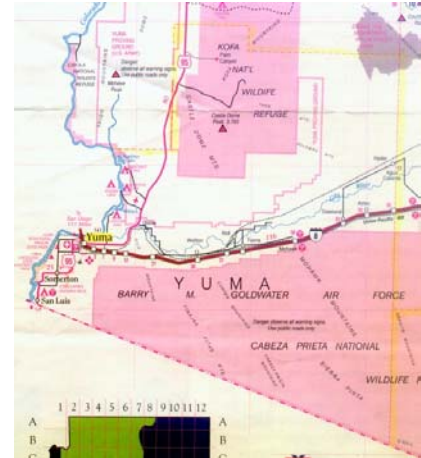


## 10.0 CURRENT TECHNOLOGY/TELECOM NEEDS

### 10.1 COUNTY

Yuma County covers a geographic territory of 5,522 square miles with a majority of the land mass incorporating an arid desert environment with elevations ranging from 100 feet to 1,000 feet in the numerous rugged mountains that dot the landscape. Primary economic drivers for Yuma County include agriculture, tourism, government and the military industry. In spite of its large geographic boundaries, only about a 10<sup>th</sup> of the land mass is privately owned (10.5% of the land is owned by corporations or individuals).

The City of Yuma is the county seat and is located in the southwest corner of the county, central to the other 3 incorporated cities and towns in Yuma County. Yuma is also the largest population center in the county. The majority of the county's population is concentrated in the geographic corridor that runs between Wellton in the south central portion of Yuma County, on I-8, west through Yuma and then south on the Highway 95 corridor that encompasses Somerton and San Luis (which is directly on the U.S.-Mexico border).



Yuma County is home to additional, much smaller settlements that are not incorporated and have extremely limited government services. Those communities include Gadsden in the south between Somerton and San Luis, and Tacna, Roll, Dateland and Aztec which all lie to the east of Wellton on the I-8 corridor. There is also a very large and rapidly growing development on the eastern limits of the City of Yuma, an area called the Foothills, which lies at the base of the western slope of the Gila Mountains.

Yuma County enjoys a robust network, employing multiple T-1s, SDSL and a gigabit Ethernet for the county's local and wide area network in Yuma (the city). The county does employ GIS and maintains a strong web presence. It has plans to expand its active use of this technology, intending to create an interactive web interface for its citizens' benefit, as well as increased access to state and federal data bases.

The County's Community Development Department is advanced in its grasp of technological capabilities and is very keen to capture the economies that such technology can provide to a sophisticated and well-run operation. The County also has the benefit of a well-trained and sizable IT support staff which stays well ahead of the technology needs of the county's departments and administration. Existing networks, projects and contracts can be characterized as adequate and redundant, and the County should certainly consider this a tremendous asset. Current broadband usage is very high and future demand is anticipated to continue to be very high. The deployment of these new applications is proof that the need for additional bandwidth is inevitable.

## 10.2 CITIES/TOWNS/COMMUNITIES/TRIBAL RESERVATIONS

### 10.2.1 Yuma

The City of Yuma serves as the county seat of Yuma County and is the site of a major military installation, the Yuma Marine Corp Air Station. Yuma is located just below the confluence of the Colorado and Gila Rivers, and the site has been recognized since prehistoric times as a preferred location for crossing the mighty Colorado River into what is now California.

Agriculture is the major employer in Yuma followed by government (all levels) and the service sector (medical, professional and tourism related). Yuma's location in the deep southwest corner of Arizona establishes it as a major port of entry between Mexico and the U.S. as well as a significant hub on the I-8 transportation corridor between San Diego, California and Casa Grande, Arizona and the intersection with I-10. In 2003, Yuma was listed as the 3<sup>rd</sup> fastest growing city in the United States.

Qwest Communications is the area local exchange carrier and does have fiber optic cable in the city, as well as digital switching capacity. Adelphia is the cable service provider and is providing digital cable service. There are numerous internet service providers in Yuma, ranging from cable to DSL to wireless services.

The City of Yuma maintains an extensive data communications system networked out of its newly constructed city hall. It has recently invested in new network infrastructure and has plans to deploy a citywide fiber network to support an "Intelligent Traffic System." The city has deployed various network topologies to support the city's needs over the past several years. The network consists of a combination of T-1's, ISDN circuits, wireless networks, TCP/IP circuits and VoIP for voice communications. Like the County, the City of Yuma enjoys the advantages of a forward-thinking, sophisticated IT team that manages an extensive network for the benefit of the community. This department has already captured significant cost savings through the employment of VoIP technologies and has plans to expand cost-savings technologies on an even broader basis. Existing bandwidth demands for the City of Yuma are already very high and are anticipated to remain so, and even increase, in the foreseeable future.

MCAS Yuma has cable service from Adelphia serving approximately 2300 billable addresses. The service coverage includes cable TV and broadband for the base housing and barracks. Qwest is positioned to deploy DSL to the same service area on the Air Station by mid- to late February, 2004.

### 10.2.2 San Luis

This rapidly growing community is a short 20 miles south of the City of Yuma. San Luis is the site of a large international border crossing. Its sister city, San Luis Rio Colorado is in Sonora, Mexico and has a population of over 200,000. The Town of San Luis has experienced exponential growth with the population rapidly increasing from 4,212 in 1990 to an estimated 19,764 in 2003.

Surrounded by very highly productive agricultural lands, San Luis enjoys an economic boost from light industry that serves both sides of the border. There is active development of a 40 acre industrial park and 40 acre commercial development on the state highway 95 frontage in the

northern section of San Luis. A major expansion of the border crossing is planned to accommodate the significant increase in demand for transportation of products across the border between the U.S. and Mexico.

Local exchange service is provided by Qwest Communications, Adelphia provides cable television service and BeamSpeed offers wireless internet access in the community. Access to fiber optic cable does not yet exist and the local switch is not digital (the PSAP is located in Somerton, 14 miles to the north). The city does maintain a local area network in the city hall as well as a wireless wide area network to some, but not all, of its external city sites. The city does not use GIS, depending instead on aerial photography for planning purposes. However, there is recognition that digital applications for planning purposes in the near term are an important tool for the city, especially in the face of such rapid growth and development.

The police department currently has direct access to the ACEGIS and NCIC databases, but would like to have broadband digital access, especially since both databases are scheduled to go digital by 2005. With its location on the international border with Mexico, San Luis recognizes that Homeland Security is extremely important and cutting edge technology will be required to meet security demands.

The economic development community in San Luis, and at least a few of its businesses, recognize the need for enhanced access to broadband technology, especially given their efforts to attract and locate intensive manufacturing and assembly plants to the area. Current technology applications and bandwidth demands are deemed to be moderate, but it is anticipated that in the very near future, bandwidth demands in San Luis will rocket into the high demand category.

### **10.2.3 Somerton**

Located just 10 miles south of Yuma, on state highway 95, Somerton is a small, agriculturally oriented community. Its location is the same distance from the Mexico border as it is from the California border. Like the rest of the southwest region of Yuma County, Somerton is experiencing significant growth and just recently undertook an ambitious annexation endeavor. This community has recently added an elementary and middle school as well as some new retail development.

Qwest Communications is the local exchange carrier and Adelphia is the cable television supplier. DSL and cable modem service are not currently available in Somerton. The city hall does have a local area network, as does the police department, but there is no wide area network capability to the outlying city offices like parks and recreation or the fire department. The police department does not have laptops in the cars, nor are there any plans in the near term to equip them with that capacity.

The city hall used to have a T-1 connection for internet access, but its private sector IT consultant recommended ending that service and switching to a wireless connection to the internet via BeamSpeed in order to save the city money. External departments have a shared dial-up access to the internet, but it can only be used by one computer at a time. The town engineer prefers to maintain mapping records in AutoCAD drawings, but the city manager recognizes there would be benefits in migrating to a GIS-based system, especially with the

planned annexation. The city is currently exploring having its sewer system migrated to GIS and has ArcView software installed.

The city does not maintain a webpage and does not have capacity to provide for that avenue of citizen access. The city manager did indicate that the residents of Somerton did value technology, and that many families made the financial sacrifice required to obtain computers and internet access for their children. Current bandwidth demand is considered to be low, but it is anticipated to increase in the short term to at least the moderate level, and perhaps even into the higher demand category in the longer term.

#### **10.2.4 Wellton**

This idyllic agrarian community is located 29 miles east of Yuma, on I-8 on the east slope of Telegraph Pass and in the scenic and fertile Mohawk Valley. Incorporated in 1970, Wellton combines a long-standing history in ranching, agriculture, and water with a more recent phenomenon of serving as a winter resort and retirement community. The area's mild winters and year-round growing season (and golf season) make it a new and highly desirable destination for the winter snowbirds from up north. There is a small, but growing retail sector in Wellton. While agriculture remains the largest economic driver and employer, energy development interests and manufacturing may be positioning themselves to exert a new economic influence on Wellton and its neighbors.

The Town of Wellton was recently awarded a \$1.3 million dollar grant from USDA to provide broadband wireless internet access to the community. Telespectra, in partnership with BeamSpeed was the successful project bidder. Facilities that now have high speed wireless internet access in Wellton are:

- Wellton Library/Community Center
- Wellton Police Department
- Yuma County Sheriff Sub-Station
- Wellton Elementary School
- Antelope Union High School
- East County School Healthcare Center
- Arizona Western Farm Service
- McElhaney Cattle Company
- Wellton Mohawk Irrigation

See Appendix H for additional information about Telespectra.

Wellton is just starting to understand and capture the opportunities that such accessibility offers, and is working steadily to harness the benefits. The police department would like to equip its patrol cars with laptops to access the NCIC database in real time. The fire department is interested in GPS and GSD applications for real time access to information on haz-mat locations and other resource databases.

The town does have GIS capability through its designated town engineer, who is based in Yuma. There is concern and frustration with its proprietary software developer because the financial software packages currently available are not oriented toward small, rural community financial needs and technical assistance is remotely located. The town maintains a web

presence, but there is no designated IT position on town staff, a shortcoming that the town would like to address but encounters financial limitations to do so.

Because Wellton is just starting to employ the technologies that demand broadband access, and given that it currently has wireless broadband access through a USDA-funded demonstration project, the current bandwidth demands are considered to be moderate. However, with the rapid development of a 500 unit planned unit development on its southern flank, and an additional 1500 units potential, this community's demand will likely leap into the high demand category in the near future.

### **10.2.5 Cocopah Reservation**

The Cocopah Indian Reservation is a network of three tribal locations that total almost 8,000 acres. Established by a Presidential Executive Order by Woodrow Wilson in 1917, the reservation land mass was increased by Congress in 1985. There is an east and west reservation, as well as the newer, north reservation. The tribe just recently completed the construction of a new casino on state highway 95, replacing an older, smaller version in a neighboring location. The north reservation hosts a golf course resort and is a favorite destination of winter snowbirds. Agriculture remains a major economic sector for the tribe, with large tracts of irrigated agriculture leased to corporate interests. Income from agricultural leases provides a level of income secondary to the casino revenues and golf resort revenues.

The unemployment rate for 2000 was 13.2%, a very low figure compared to other reservation statistics, but the 2002 estimated unemployment figure has risen to 18.7%. The Cocopah Tribe has been recognized for its ground-breaking intergovernmental agreement on mutual aid fire protection with the City of Somerton which borders the west and east reservations. The tribe is a member of the Yuma Metro Planning Organization and has participated in the Area Service Highways project which runs from Yuma to the border.

Qwest Communications is the local exchange carrier. The tribal administrator has indicated that service quality is not good and there is a need for expanded access for the casino, which currently has 2 T-1s in service, one for voice and one for data purposes. Adelphia has installed fiber to the golf resort on the north reservation, but has not extended service to the west and east reservations, stopping just short of the casino location on the east reservation. The casino is currently using satellite access for television service.

Internet access is available from Cochise Internet and Sierra Vista but DSL and cable modem service are not available. In 1995, the tribal council authorized the purchase of new computers. Since that time, a plan has been developed to obtain 200 state-of-the art computer modules with a refresh rate of 3 years. The tribal administrator, who has a background in IT, clearly is cognizant of the importance of technology for the future of the tribe. There is interest in educational, cultural, environmental, and health-related applications using broadband access. At the current time, there is low demand for bandwidth, but that demand is expected to increase in the near future with the addition of the new casino and other tribal plans, to the high demand category.

## 10.3 EDUCATIONAL

### 10.3.1 K-12

No other market segment has had the price subsidy support and statewide design assistance that K-12 schools have had. Two key factors in recent development of the K-12 network infrastructure are:

- Federal E-rate subsidy support for telecommunications services, internet connectivity, and internal connections (such as routers); and
- The Arizona School Facilities Board's Students FIRST program which upgraded network technology to provide school LANs and district WANs that aggregate school district internet access to a single broadband connection point, called a District Aggregation Point, or DAP

**"The Internet use for email and communications by students and staff is increasing at a fantastic rate. Within two years, over 2,000 users a day will be accessing the internet through our network."  
Gadsden Elementary School**

In most rural communities the school is often the only user of higher-bandwidth connectivity, but even in their larger, more urban communities, it may be the first place residents are exposed to advanced network applications and higher bandwidth services.

Typically, network development planning encourages just the sort of district-level aggregation that has already been achieved in Arizona via the Students FIRST initiative. Connectivity to the Students FIRST program's minimum standards (established in May of 2000) was reported completed as of June 30, 2003, so connectivity goals can be said to have been met. [No summary project report or individual county data was available from the Arizona School Facilities Board. A public information request for individual district information identifying district aggregation points (DAPs) was pending as of February 10, 2004.]

The definition of "broadband," however, may still be subject to local limitations. One Yuma County town – Dateland – was unable to get a T-1 circuit for its schools from its local independent telephone company, the Arizona Telephone Company (a TDS company), and has had to resort to satellite connectivity. The satellite connection is at T-1 bandwidth, but appears to have some performance problems due to latency issues.

Interviews with district representatives report few performance issues, and a general sense of adequacy with current bandwidth investments (typically T-1). However, as schools begin to sample more advanced applications such as online interactive IP video distance learning, streaming video and online multimedia courseware, a T-1 connection will begin to seem less than adequate.

### E-rate

A survey of E-rate funding and the potential impacts of upcoming changes in the E-rate subsidy program that resulted from recent fraud and abuse investigations will be completed in the next phase of the CTA process.

## Students FIRST

Students FIRST (Fair and Immediate Resources for Students Today) is the popular name of legislation enacted to resolve a court-ordered requirement to develop a constitutional system of school capital finance to address inequities in Arizona's existing school funding system. That system, based on a secondary property tax and limited by the property wealth of a school district, had been declared unconstitutional in 1994 because it failed to conform to the state constitution's "general and uniform" clause. The complete text of the Student FIRST legislation is at <http://www.azleg.state.az.us/legtext/43leg/3s/bills/sb1002p.pdf>. After a four-year legal and legislative battle, the legislation establishing Students FIRST was signed on July 9, 1988, creating a School Facilities Board (SFB) to administer the program.

Strictly defined as a school capital finance program, Students FIRST is funded by revenues dedicated from the state transaction privilege (sales) tax. Through the School Facilities Board, public school districts in Arizona received funding for the correction of deficiencies in existing school facilities, building renewal, and new school construction, while continuing to have the ability to raise local funds through limited general obligation bonding and capital overrides. The primary goal of Students FIRST is remediation and equity.

One of the purposes of StudentsFIRST was called "Deficiencies Correction" – upgrading existing schools to defined minimum standards. The Students FIRST law established a deficiencies correction fund for the purpose of correcting deficiencies in existing school facilities. Deficiencies might take the form of a square footage deficiency or a quality deficiency, and had to be corrected by June 30, 2003. The School Facilities Board is charged with adopting rules establishing minimum school facility guidelines, assessing school buildings against these guidelines, and providing monies to bring the buildings up to the guidelines. On November 18, 1999, the Board adopted Building Adequacy Guidelines that now serve as the minimum standards for existing and new school facilities in Arizona.

SFB Technology Initiatives derive also from its task of deficiencies correction. The Students FIRST law also required the School Facilities Board to address technology adequacy in Arizona schools. The SFB adopted a three-part plan to address educational technology. The plan included bringing the computer to student ratio to 1:8 in every district, networking and internet connectivity, and a providing a common, centralized application service provider.

## Computers

One of the first steps in SFB's technology initiatives was the purchase, in 2000, of more than 36,000 computers for public school districts at a cost of \$44.2 million. These computers were classed at the time of their purchase as multimedia workstations equipped at a minimum with Pentium III 600 MHz Intel processors with Windows 98, NT, or 2000, or Apple 350 processors with OZ9. Each also was equipped with a minimum of 64 Mb of RAM and 20X CD ROM drives and network capability.

The computer distribution that initiated the SBF technology initiative happened so long ago that these machines must be considered, for all practical purposes, obsolete.

## Network and Internet Connectivity

In February of 2001 the SFB approved a \$100 million networking and internet connectivity project that was intended to substantially improve and support "state-of-the art networking



technology to the desktop." The project was to connect all network capable computers in every school to a local area network (LAN). All schools within a district would be aggregated into a wide area network (WAN) that provides a single district aggregation point for broadband connectivity to the internet. The internet and LAN structure is required to be capable of supporting a converged network (voice, video, and data to each networked computer). The district network infrastructures include 100Mb (expandable to one Gigabit) Ethernet connectivity to the classroom and 10/100Mb of connectivity to each networked computer. Installed project hardware includes switches and routers, cache engines, and content managers. Filtering software and firewalls are also included. The project was originally scheduled to be completed by summer 2002.

Original SFB Network and Internet Connectivity standards (annotated with an amendment), as published in an SFB FAQ, were:

"...the minimum objectives are to provide the following:

- Internet connectivity to all instructional areas in all public schools
- 100 Mb connectivity to all instructional areas, expandable to 1 Gigabit (expansion may require additional equipment purchases by the district)
- 100 Mb connectivity to each networkable computer both in instructional areas and any other non-instructional areas that have networkable computers; e.g., administrative areas
- Filtering software and firewalls for all districts
- Cache engines at all schools having a minimum of 25 networkable computers (revised 12/10/2001)
- Unmanaged 10/100 auto sensing switches at all locations
- All computers in each school on a LAN
- All School LANs in a district aggregated on a District-wide WAN
- Connection to the internet via the district aggregation point with broadband potential
- Availability of an Application Service Provider (ASP) educational content and productivity software, with updates and support through June 30, 2005
- 3 years of remote network monitoring
- Remote and onsite maintenance
- Technical training and professional development to support the Networking and Internet Connectivity Project

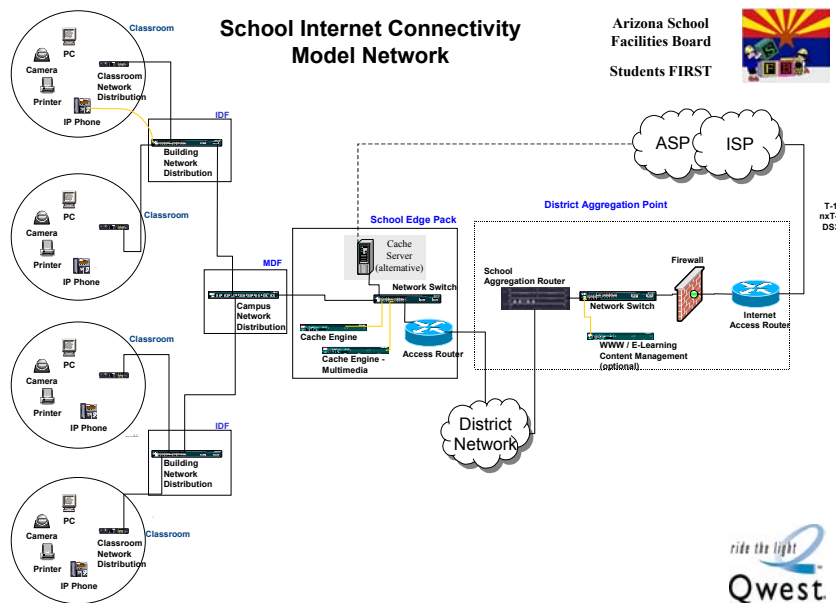
In summary, each District will have, at minimum, networking to each and every networkable computer both in instructional areas, and any other non-instructional areas such as administrative offices, all the switches and routers needed to make it all work, caching and content engines to provide speed and breadth of curriculum material served over the internet, a content manager, ASP educational content and productivity software, updates and support through 6/30/05, 3 years of remote monitoring and on site service for the network, technical support 24/7, and a firewall and filtering software if needed."

[-- SFB FAQ #66]

A school internet connectivity model network illustration appeared in an SFB "Wiring The State" presentation (5/2/02): <http://www.sfb.state.az.us/sfb/sfbdoc/tech/wiringthestate.ppt>

Qwest internet connectivity specifications from its Design Document (sections 4.1 and 4.4) are paraphrased below:

- District**



*schools will connect to the internet via a District Aggregation Point (DAP). Connections may include any of the following, but are not limited to: Private Line Transport (56Kbps, DDS, 1.54Mbps T-1, 45Mbps T3, etc.), Frame Relay, ATM, ISDN, xDSL, VSAT, and wireless. Limited access may require the use of wireless connections in some areas. Wherever multiple options exist, the least expensive/highest bandwidth installation will be offered.*

- Qwest design and implementation efforts will target a MINIMUM of a T-1 connection to each school even if the District may not be able to afford a T-1 connection at the time of implementation. This requirement was a specification of the SFB to provide a migration capability so that each school will be able to upgrade to a circuit capable of delivering the services that the ASP will provide...*

On May 17, 2002, Qwest informed the SFB that it would not begin work on any new projects. As reported in a June 13, 2003 special audit report by the State of Arizona Office of the Auditor General to the Joint Legislative Audit Committee:

Qwest stated that finishing the projects it had already started would require it to exceed the original \$100 million purchase order. Qwest also informed the Board that current work on the projects would continue until the specific phase of work was completed, but that the next phase would not begin. On May 23, 2002 Qwest informed the board that it would need an additional \$80 million to finish wiring all school facilities in Arizona for internet connectivity. Qwest reports that as of June 11, 2002, 525 facilities had been completely wired, wiring was in process at 329 facilities, and Qwest has yet to begin wiring at approximately 628 facilities.

On August 1, 2002 SFB announced an agreement to modify the original agreement from a \$100 million purchase order to a lump sum contract for \$140,768,00 (modification of State of AZ P.O. E01SF221; September 20, 2002). Modifications to the original agreement included removal of

Qwest's requirement to provide on-site equipment maintenance and other network management and maintenance services. Completed sites already receiving these services were notified that the services would be discontinued effective August 31, 2002.

The new completion date for the modified Statement of Work was June 30, 2003.

**Important Note:** The Students FIRST technology initiative has been tainted by news of Qwest's SEC fraud indictment related to how early equipment purchases were prematurely booked as completed sales, by the news that Qwest was unable to complete the project at the originally contracted \$100 million dollar price, and by questions of the contracting process, allegations of conflict of interest by the SFB's original Executive Director, and other, minor criticisms. However, the resources made available in the program to create district-wide WANs and other portions of the effort provided some advanced technology advantages to districts that may not have occurred otherwise.

Also note that only public school districts were eligible for SFB technology project participation. Charter and other private schools were not. This exclusion was addressed in an answer in the SFB FAQ:

Charter Schools are established in Arizona pursuant to ARS 15-181(A) which states "Charter schools may be established pursuant to this article to provide a learning environment that will improve pupil achievement. Charter schools provide additional academic choices for parents and pupils. Charter schools may consist of new schools or all or any portion of an existing school. Charter schools are public schools that serve as alternatives to traditional public schools and CHARTER SCHOOLS ARE NOT SUBJECT TO THE REQUIREMENTS OF ARTICLE XI, SECTION 1, CONSTITUTION OF ARIZONA, OR CHAPTER 16 OF THIS ARTICLE." Chapter 16 is the section of ARS that describes Students FIRST. Thus, Charter Schools were specifically omitted from Students FIRST by Statute. [SFB FAQ# 98]

Districts that already have a network that is functionally equal to the SFB model or that has been recently upgraded at district expense and happens to meet the SFB network connectivity requirements will be considered complete and compliant and will not receive additional SFB funding, or will receive funding only for work necessary to meet all requirements of SFB's standards.

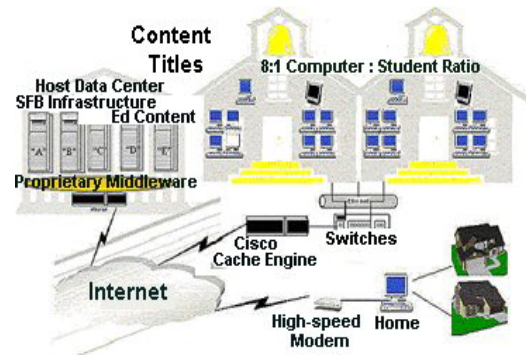
### **No Summary Data Available.**

Despite repeated requests, neither Qwest nor the Schools Facilities Board were able to identify which districts received full or partial implementations, nor were they able to provide any summary descriptions of the work or evaluation materials to this report. Therefore, it is impossible to determine a dollar amount for the total investment from the SFB technology initiative in Yuma County.

Each district recently received a CD-ROM from the SFB containing "As Built" data for their implementation. The CTA project consultants requested copies of the Statement of Work and network diagrams from these "As Built" records for all districts in the County. These documents describe the initial design for the districts and may not accurately reflect what was eventually implemented. The public information request to the SFB that will provide these documents is currently in process. These documents will be included in the Education Appendix of the final report.

## SFB Application Service Provider component

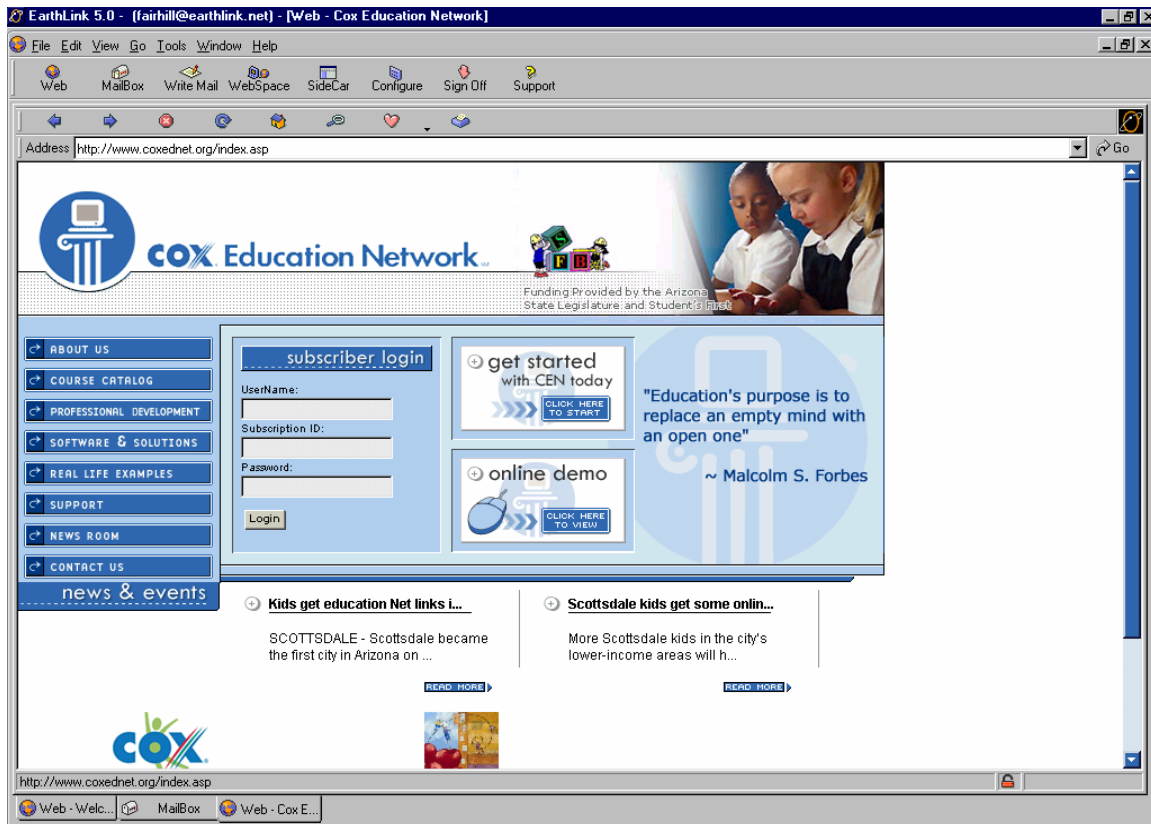
The third element in the SFB technology initiative is providing a common, centralized application service provider (ASP). In August 2001, the board awarded a contract to Cox Business Services, which formed Cox Education Network. The following is an illustrated outline of the ASP technical structure:



[-- image from SFB FAQ at

[http://www.sfb.state.az.us/sfb/sfbMain/cont\\_faq\\_faqSection.asp?secl=7](http://www.sfb.state.az.us/sfb/sfbMain/cont_faq_faqSection.asp?secl=7) ]

A recent screen capture of the COX Education Network web site:



<http://www.coxednet.org/index.asp>

An SFB fact sheet describes the Cox Education Network ASP offering:

"...The network will provide the industry's most expansive collection of educational tools and resources for teachers and students throughout Arizona. The ASP will enable schools to access productivity software, over 250 educational titles, and communications software. These resources will be available over the internet and can be accessed by students, teachers, and parents from school and from home – anytime, night or day. An additional 7,000 educational titles will be available for purchase by districts at discounted rates. The ASP will host school and teacher websites, e-mail services for staff and students, portfolio storage for student work, and support services to all schools and students. Additionally, the project provides for professional teacher training by ASSET, 20 Cisco Academies, and multiple Microsoft-Authorized Academic Training Programs to be placed throughout the state. All schools will have access to the ASP by summer, 2002; service, warranty, and free access to the ASP are included until June 30, 2005.

The ASP cost the state roughly \$28 million (approximately \$8 per student per year, until 2005). School districts are not required to use the Cox Education Network service, and, if they do use it, they would have to pick up its cost on an individual basis after 2005. Cox Education Network is a content service and is not eligible for e-rate cost subsidy.

In an August 25, 2003, press release, Cox reported that over 700,000 subscribers, including students, teachers, and administrators are logging onto the Cox Education Network (CEN) annually. In response to a request for information about the users of CEN in Yuma County, a CEN representative identified the Gadsden USD in San Luis as the heaviest user of CEN in the county. Other Yuma County CEN users were:

Antelope UHSD  
Crane Elem SD  
Hyder Elem SD  
Mohawk Valley SD  
Somerton SD  
Wellton Elem SD  
Yuma Elem SD  
Yuma Union HSD

CEN did not make available more detailed information about usage. They recommended contacting the person who handles the CEN desktop for each district for additional information about use and performance within districts.

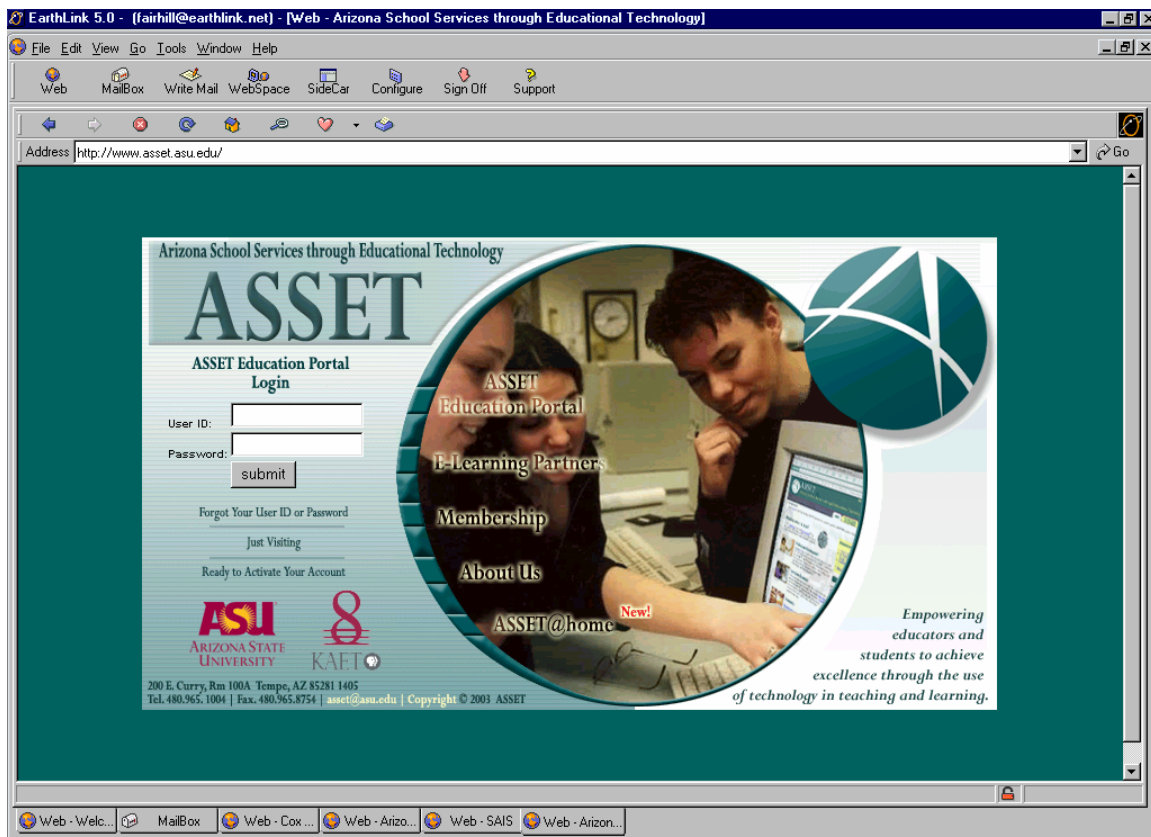
#### **ASSET (Arizona School Services Through Educational Technology)**

ASSET is the professional development service that is a component of the SFB ASP offering. The ASSET website includes the following description "About ASSET":

## ASSET Education Portal

The ASSET Education Portal was launched in May 2002 and was designed to offer educators a wealth of professional development opportunities and curriculum resources.

All of the ASSET resources currently available online are only found through the Portal. Educators will need to register with the ASSET Education Portal to take part in the online registration process for Self-Paced, Classroom Connect's Connected University, and PBS TeacherLine courses. ASSET members also gain personalized access to curriculum resources, such as United Streaming, by registering on the portal website.



<http://www.asset.asu.edu/>

Advanced, bandwidth-hungry application resources such as ASSET are one reason why Yuma schools may need to look beyond district T-1 connectivity.

Student education and teaching staff support, however, are not the only reasons high-bandwidth connectivity will continue to grow. School district internet connectivity also supports administrative data reporting that provides more real-time decision-making information for state school finance and policy issues. This is accomplished via a system called the **Student Accountability Information System** or **SAIS**.

**SAIS (Student Accountability Information System)**

In the Summer, 2002, issue of Spectrum: The Journal of State Government, Hayford Gyampoh, director of MIS and CIO for the Arizona Department of Education, described the Student Accountability Information System:

Arizona's Student Accountability Information System interconnects Arizona's schools and Education Department through the internet. Electronic collection of student detail and school financial information reduces costs and paperwork and facilitates state and federal reporting. Online analysis supports education decisions.

School districts, including both traditional schools and charter schools, are connected to the Arizona Education Department through the Student Accountability Information System (SAIS). Timely school financial information is collected rapidly and accurately and is stored in the department's data warehouse. Electronic data collection is already bringing about reduced costs and paperwork in Arizona. Real-time detailed information is now available to be aggregated to satisfy a variety of state and federal reporting requirements, and can be used by educators, legislators and the public for driving policy decisions about education.

This is one area of network use that has deadline driven reporting requirements for administrators in all Yuma County schools.

**Shared Resources / Infrastructure**

There are a number of shared resources serving library and educational users in Yuma County. The AWC/NAU-Yuma Academic Library is a shared resource. The T-1 link from AWC to Antelope Union High School is a resource shared by both APSCC (school for internet access; NAU is the provider) and AWC/NAU-Yuma (for its ITV uses). AWC/NAU-Yuma also either maintains its own ITV classrooms or uses regular classrooms for course offerings at San Luis Middle School (AWC classroom), Somerton Middle School (AWC classroom), Antelope Union High School (mentioned above), and Dateland elementary school.

**Other Network Initiatives**

CyberSchool Movement – Three traditional school districts won approval this year to start offering CyberSchool services using the internet: Peoria, Tempe Union, and Tucson. There are openings for two more district-run schools to participate in an Arizona pilot program to see how well cyberschools teach children. Peoria and Tucson reportedly plan to begin enrolling students in cybercourses this year. Tempe Union will be taking this school year to plan a virtual high school that is slated to open next year. These three school districts, new to cyberschooling, join Deer Valley and Mesa, districts that have been operating cyberschools for four years. There are also seven charter cyberschools operating in the state.

No school district in Yuma County provides cyberschool programs. For more information on cyberschool programs see the Distance Learning section of our final report.



## Findings

The following observations are based on information collected in a variety of ways, including personal interviews, phone interviews, faxed survey forms, e-mail queries, and examination of the public record of e-rate application/commitments and as-built records at the Arizona Schools Facility Board.

The quality and detail of the responses gathered varied with the job title of the person responding. School Technology Coordinators/Directors provided technical and usage details that Principals, Superintendents, and Business Managers typically might not. Administrators provided operational and cost concern commentary that Technology Coordinators might not. An assessment of how network connections performed in terms of classroom and curriculum integration of online applications in surveyed schools is outside the scope of this report.

## Connectivity and Issues

There are three major network aggregation "players" in the education community of Yuma County: AWC/NAU-Yuma, the Yuma Educational Consortium, and the Arizona Public Schools Computer Consortium. There is overlap (and in at least one case, sharing) among services at some districts. Briefly, here is what each does:

- **AWC/NAU-Yuma** integrates two- and four-year higher education offerings, as well as selected offerings from ASU and University of Arizona. It also extends its degree programs, lifelong learning, and professional education offerings to multiple sites in area population centers, including several K-12 school sites, a remote campus (in La Paz County), and a Career education center (in Yuma).
- **The Yuma Educational Consortium (YEC)** is a cooperative effort of the Yuma Elementary School District, Yuma Union High School District, Arizona Western College, and Northern Arizona University, to combine and share programs, resources, services, and personnel. Its consortium services include Computing, IT, and telecommunications; transportation; wastewater treatment / irrigation; security; grounds maintenance; health insurance; libraries/media center; and property management. In practice, the telecommunications efforts of the YEC link more than 40 sites (K-12, administration and Libraries) and AWC/NAU Yuma telecommunications is linked to, but separate.
- **The Arizona Public Schools Computer Consortium**, based in Flagstaff, is a statewide cooperative venture of member school districts in Arizona, authorized by a cooperative purchasing agreement among public school districts, county school superintendents, and Northern Arizona University. APSCC offers a combination of financial, student information, network and internet services to its participating members. Recent APSCC participants in Yuma County include: Hyder Elementary District; Gadsden Elementary District; Mohawk Valley Elementary District; Antelope Union High School District; Wellton Elementary District; Crane Elementary District; Yuma County Schools office; and the Yuma County School Superintendent's Coop.

School districts in Yuma County show the ubiquity of T-1 connectivity. However, the issue of how to move beyond T-1 connectivity opens questions of dark or lit fiber access, gigabit Ethernet connectivity, licensed microwave wireless solutions, and ATM connectivity. The twin issues of the future of bandwidth for educational users in Yuma County are 1) is there some

way to obtain better commodity pricing of aggregated internet connectivity, and 2) are there practical means to move beyond the limitations of multiple T-1 connectivity towards a wider area Gigabit WAN Ethernet or to other forms of vendor-supplied multi-megabit connectivity.

The Students FIRST networking project has implemented district-wide WANs, with school LANs that are supposed to be capable of 100 Mb Ethernet speeds. The District WANS are also supposed to be capable of upgrading to Gigabit Ethernet connectivity. Each district WAN should have a centralized network connectivity point, called a District Aggregation Point or DAP. Details regarding DAP design for each school district have been requested via a public information request from the Arizona Schools Facilities Board, but have not been received as of the preparation of this report.

The predominant technology is frame relay, although ATM is reported to be recently disclosed (by Qwest) as available in Yuma. No respondents to this survey identified ATM as their connection type. The YEC reports that it will be purchasing an additional DS-3 in the coming year and upgrading its final internet connectivity from 8 T-1s (12 Mb). This increase may be contingent on additional participants switching their internet connectivity to YEC.

### **The Yuma Educational Consortium (YEC)**

The Yuma Educational Consortium is a local resource sharing initiative formed in 1991 to provide economical combined services for Yuma Union High School District #70, Yuma Elementary School District #1, Arizona Western College and Northern Arizona, Yuma Campus.

YEC's success with a number of categories of shared services make it a model for "best practice" activity if shared services across multiple districts become more widely implemented. YEC Consortia include a Computer Consortium, a Transportation Consortium, a Wastewater Treatment Consortium/Irrigation Consortium, a Telecommunications Consortium, a Security Consortium, a Grounds Maintenance Consortium, a Health Insurance Consortium, a Community Library and Media Center, a Property Management Consortium, and even a "Strings Consortium" -- a combined effort between Yuma Elementary District #1 and Yuma High School District #70 to provide instruction and equipment for an orchestra.

There is political pressure to reduce the administrative costs of school districts statewide. Most recently, two Arizona lawmakers proposed consolidation of school districts into much larger districts for economies of administrative services.<sup>24</sup> A Goldwater Institute study<sup>25</sup> found that there would be little actual savings in the legislation proposed, and that the proposed consolidation might also jeopardize academic achievement. However, models such as YEC could be replicated and expanded across the state to achieve demonstrable efficiencies and cost savings.

YEC programs include Computer and Telecommunications consortium services. The YEC Computer Consortium provides the following combined resources:

- Aid in software evaluation
- Aid in hardware evaluation

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<sup>24</sup> <http://www.azstarnet.com/education/31128SCHOOLS.html>

<sup>25</sup> <http://www.goldwaterinstitute.org/article.php/403.html>

- Aid in design of Wide Area Network (WAN)
- Service for network infrastructure
- Service for desktop computer hardware and software (Intel and Apple platforms)
- Assists technical committees in meeting goals
- Assists curriculum committees in meeting technology goals
- Serves as a single point of contact for all technology-related issues

The Computer Consortium is located in the YEC Technology Center at 596 South 4<sup>th</sup> Avenue in Yuma. It is headquarters for both the Computer Consortium and Telecommunications Consortium services of the YEC. The facility includes a thirty-seat, high technology classroom (with a **SmartBoard™** touch screen PC system, 30 networked computers for staff development/training), offices for staff, and a computer repair center staffed by certified technicians for both Intel PCs and Apple Macintosh computers.

The YEC acts as the aggregation point for a Wide Area Network (diagram on following page) which encompasses two DS-3/48 channel high speed network circuits providing 96 channels of connection for:

1. accommodation Campuses: 17 elementary school, 5 public high school, one private high school, one high school, and one accommodation middle school
2. Administration: 6 high school district buildings and 4 elementary school district buildings
3. Libraries: the Yuma County/City Main library and 6 regional county branch libraries.

In addition to the County Public Library system, the Telecommunications Consortium provides service to three other locations outside the two Yuma public school districts that comprise its primary WAN: the Yuma Catholic High School, Juniper Tree Academy Charter School, and the San Luis High School. YEC has provided technology assistance to the AZ-TEC High School, donating computers and helping set them up at the site, which is a juvenile justice facility and receives its network connectivity through the (adjacent) court system. The YEC is an approved e-rate service provider for internet connectivity.

AWC/NAU-Yuma and the Consortium have some shared telecommunications links, but the higher education campus does not receive its internet connectivity through the YEC consortium. This is due, in part, to the dramatically different needs of each group's constituency such as the Child Internet Protection Act filtering required for schools and libraries receiving federal E-rate subsidy funding.

Participation in the YEC from users outside its district 70/district 1 WAN is voluntary and is market driven, *i.e.*, when YEC can demonstrate price/service advantages to users, the likelihood of participation increases. YEC has documented monthly savings, for example, of approximately \$8,000 in its initial implementation of VOIP in three high schools and three elementary schools,

an annual saving of \$96,000. Some examples of other savings and operational facilitation were also identified in a recent Consortium Overview document:

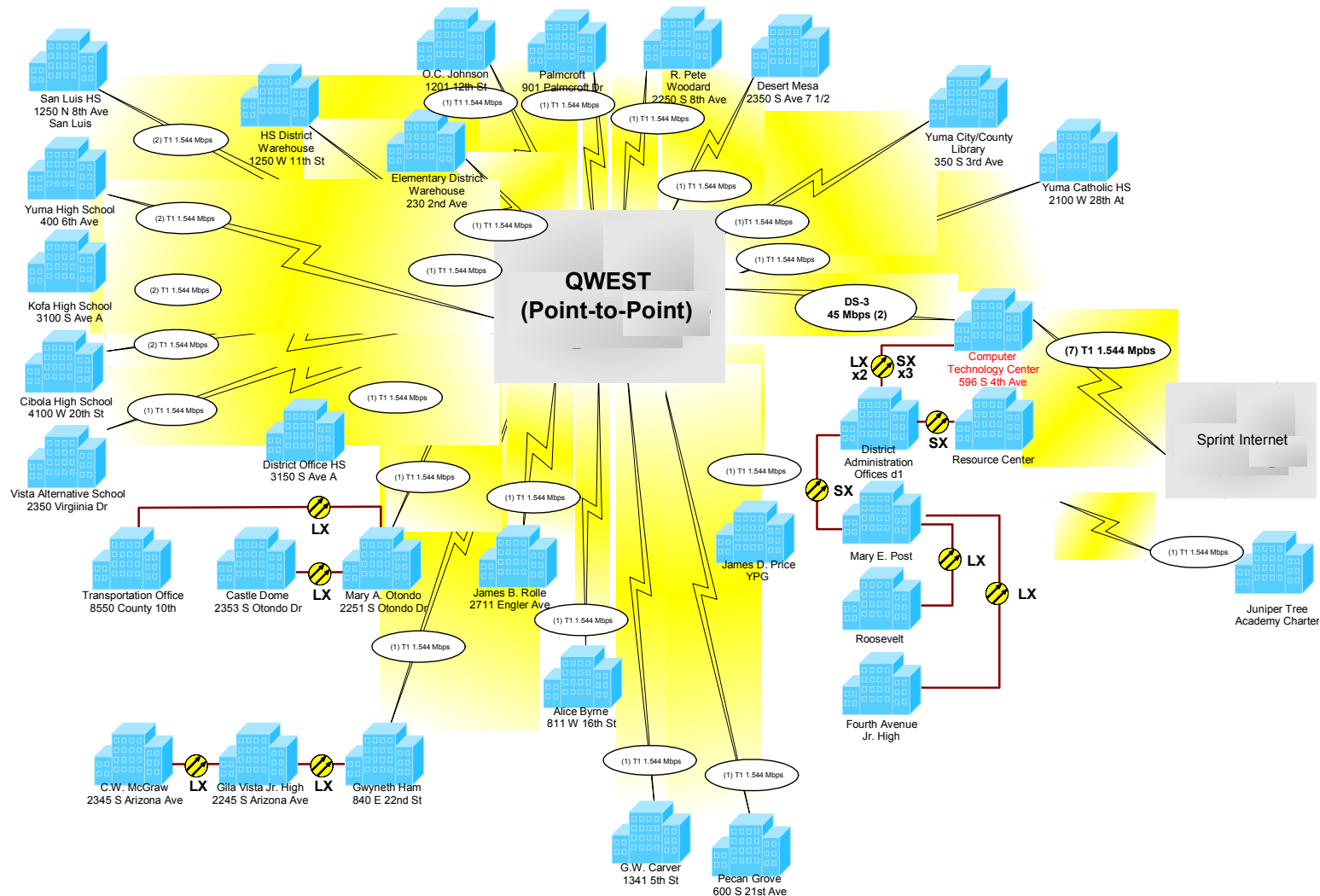
Recurring personnel costs, though likely the largest single budget item, are benefited by structuring the job duties to cross over between partners. An example would be the **eSIS™** student information system support team. This team, consisting of a core of four people, maintains the data integrity for the high school and elementary districts. This commonality of effort provides expertise to deal with the constantly changing environment at the Arizona Department of Education and its reporting methodology. This core team is supported by a common Tech Support Line Maintained with three personnel serving all users within the consortium. The combination of these teams also provided the initial training to Teachers and Staff in the operation of the web-based interface of the system. ***The delivery of this initial training alone saved the districts a combined \$100,000 in services that would have been delivered by the vendor.*** Ongoing training, including annual "new teacher" training can be provided by the in-house eSIS team.

A similar scenario exists in network infrastructure design, repair and maintenance. By using a common Wide Area Network it is assured that information can flow freely between partners. Many common services are provided on the network to aid in the performance and job duties of the Consortium member's personnel. Services such as filtered internet access are provided to every classroom for use by all students and teachers. E-mail is provided to all staff and teachers to allow information exchange. Server-based programs such as *Accelerated Reader* and *Accelerated Math* are provided for use system-wide as required. The High School District provides a system-wide web based library system that allows students to browse inventory and reserve books online from any location, including home. All of these features are monitored and maintained by the Consortium staff. ***These network services alone, if provided out of house under contract, would be in excess of \$75,000 per year.***

The YEC has a support relationship with the City of Yuma, which uses the same vendor equipment and has a trained staff on site for consultation. The YEC also provides web hosting for some community organizations, including Yuma Human Services:

In other, community related areas the Consortium has provided a platform for the hosting of numerous web sites. Included in this grouping is the internet site for Yuma Human Services under the umbrella of the Yuma County Coordinating Council (YCCC). This site is an aggregation of organizations and agencies including most if not all of the not-for-profit agencies located in Yuma County and can be reached on the World Wide Web at <http://yumahumanservices.yumaed.org/> . There are in excess of one hundred agencies and organizations listed and linked on this site.

The YEC is a model of local aggregation for both technology and traditional services cost sharing. The practice allows spreading both the startup and recurring costs of services over a larger group and lowers the investment cost per student (of particular interest to smaller organizational participants). The consortium model also creates a platform for piloting (and debugging) advanced technology services (such as VOIP) and it allows the aggregate entity to purchase technology such as switches at a higher level of sophistication and capability.



## The Arizona Public Schools Computer Consortium

Before there were local consortiums such as YEC, there were statewide efforts at technology assistance and facilitation. The Arizona Public Schools Computer Consortium (APSCC) is one of these, fostered by Northern Arizona University and begun in 1974. The Arizona Public Schools Computer Consortium is a cooperative comprised of member school districts in Arizona and authorized by a recently-updated cooperative purchasing agreement among its participating public school districts, county school superintendents, and Northern Arizona University.

APSCC was created with a goal of servicing the computing needs of member K-12 schools with a range of technical services, including planning, application support, and training. The APSCC serves as problem-solving role by identifying common technology issues among its constituency and then offering services to help its members deal with them.

Member school districts pay an annual fee for the services they use. These can be a combination of financial, student information, network and internet services. Other charges might occur from the purchase of individualized packages. Fees are based on the cost of providing the services across the consortium.

APSCC offers an array of IT-related support services, including Student Information Systems, Finance and Administration Systems, and Purchasing services. APSCC also provides extensive networking and internet solutions.

For a complete description of current APSCC offerings see their 7/03 brochure in PDF form at <http://apscweb.apsc.nau.edu/services/director/APSCC%20Brochure.pdf> or visit their website <http://apscweb.apsc.nau.edu/>

Present or recent Yuma County participants in APSCC include:

SCHOOL	LOCATION	CONNECTIVITY
Hyder Elementary District	Dateland	Satellite T-1 (OptiStreams)
Gadsden Elementary District	San Luis	Multiple Frame Relay T-1s
Mohawk Valley Elementary District	Roll	Fractional Frame Relay T-1 (256K)
Antelope Union High School District	Wellton	Frame Relay T-1 (AWC/NAU split costs)
Wellton Elementary District	Wellton	Wireless T-1+ (?) previously 56k Frame Relay
Crane Elementary District	Yuma	2 Frame Relay T-1s, one Internet link from NAU and one from Qwest
Yuma County Schools Office	Yuma	?
Yuma County School Superintendent's Coop	Yuma	1 Frame Relay T-1

## Issues

Survey responses and interviews identified few issues among education networking users in Yuma Counties. All respondents report few problems with vendors, but also that vendors are not very responsive. Adelphia Communications, for example, is unresponsive to queries about the possibilities of dark fiber leasing to educational users. The Arizona Telephone Company is unresponsive to the connectivity needs of Dateland schools, and so on.

## Redundancy

One school district, Crane Elementary (not a participant in the YEC Telecommunications Consortium), has implemented dual network connectivity to provide redundancy of service. It has two T-1s, each going to a separate vendor, with a failover system in case one or the other of the links goes down.

Redundancy is the missing element in most of the reliability problems noted above. In many communities there is only one provider of network connectivity or the multiple providers are re-selling the incumbent telco's infrastructure, so that it is a single connection which may fail. In more developed areas, multiple vendors or multiple connectivity methods (both fiber optic and wireless, for example) can provide some measure of redundancy for organizations that can afford multiple connections or redundant technology investment. This requires the technical capability to build and maintain a fail-over system that can automatically switch their connection when one provider goes down. A statewide effort could design and recommend a cost-effective, "best practice" methodology for smaller districts for this purpose.

## Summary

Over all, schools in Yuma County are unusually well positioned for aggregated connectivity. Currently most achieve this through the Yuma Educational Consortium. The next step will be to develop affordable strategies for multi-megabit access for district sites, in particular, sites in eastern Yuma County such as Dateland, which have connectivity limitations. A final step will be determining the governance or process issues that will allow the three education networking organizations active in the county to find a common ground for increased sharing of network resources and better aggregating their purchasing power for their upstream internet connection.

### 10.3.2 Higher Education

In common with other states, Arizona's internet infrastructure has its origins in higher education research projects and early experiments in extending network access to off-campus and rural sites in the state. These very early efforts grew into a network project named The Arizona State Public Information Network (ASPIN) for internet access. There was a similar development effort, centered at Northern Arizona University, which resulted in a statewide ITV network called NAUNet (see the Distance Learning section of this report for more information about NAUNet). The following paragraphs (from three sources) briefly describe the origins and purpose of ASPIN:



...Since its 1987 inception, the Arizona State Public Information Network (ASPIN) coalition has been pivotal in the establishment of state networking resources. ASPIN garnered funding and established Arizona's first connections to what has become the internet. The ASPIN coalition extended this connectivity from the Universities, to the rural community colleges, and on to K-12, while building partnerships between University researchers, and the Arizona community. Currently, ASPIN maintains a close relationship with K-12 schools, state and local government, the legislature, the business community, and Arizona's universities to facilitate the development of mutually beneficial collaborations. By utilizing these strong relationships established under ASPIN, a diverse community of interests unites and combines resources with the K-12 education community to initiate and implement field-based, community-driven projects.

[-- from "About Us" at the still extant ASPIN website:

<http://aspin.asu.edu/about/> the page includes a link to a 17 minute RealVideo clip about ASPIN.]

...ASPIN, led by Arizona State University in collaboration with the University of Arizona and Northern Arizona University, provided the first successful linkage and interconnecting of multiple universities, community colleges, agencies of city, county, and state government, plus several high tech industrial sites in Arizona (i.e., Motorola, Intel, etc.). Completed in 1991, phase one of ASPIN resulted in a computer network interconnecting the cities of Flagstaff, Phoenix, and Tucson. <http://aspin.asu.edu/vbns/ASUNet/Content/tasunt.html>

...Arizona State Public Information Network (ASPIN), based at ASU, assists Arizona's public organizations and communities in connecting to the internet. Phase I connected the three primary urban areas of Flagstaff, Phoenix, and Tucson with a state-wide backbone and within these urban areas they have provided connections to many organizations (over 50 in Phoenix). Phase II, aided by NSF funding, extended the backbone out to the state's eight rural community colleges and from there into their communities. Phase III is a proposed plan to connect Arizona's K-12 schools to the backbone developing a robust educational network. ASPIN also staffs and supports three state-wide Network Information Centers (NICs) providing a one-stop ready reference point and help desk for internet users. <http://www.researchedge.com/uss/note.html>

A fall, 1997 diagram shows connectivity detail for sites linking to the internet via ASU: <http://aspin.asu.edu/vbns/ASUNet/Content/dstate.html>. Of Yuma County sites only Antelope High School (Wellton), Somerton High School, University of Arizona, Ag in Yuma, and Arizona Western College are listed. University internet access provision in the state was segmented by campus geographic region: NAU provided services in Northern Arizona, ASU in central and south-central Arizona, and University of Arizona in Tucson provided service in south-east Arizona.

The rise and boom of the internet in the mid-1990's and the commercialization of internet service provision, plus state rules that limit competition with commercial businesses, caused the ASPIN statewide network concept to change to a more conservative provision of services. All three campuses now provide internet access only to university-research linked sites (typically via grant funded research programs generated by the various university departments), program operational sites such as state Cooperative Education offices and a remote weather sensing network, and a handful of other sites that continue their ASPIN-era connectivity relationships.

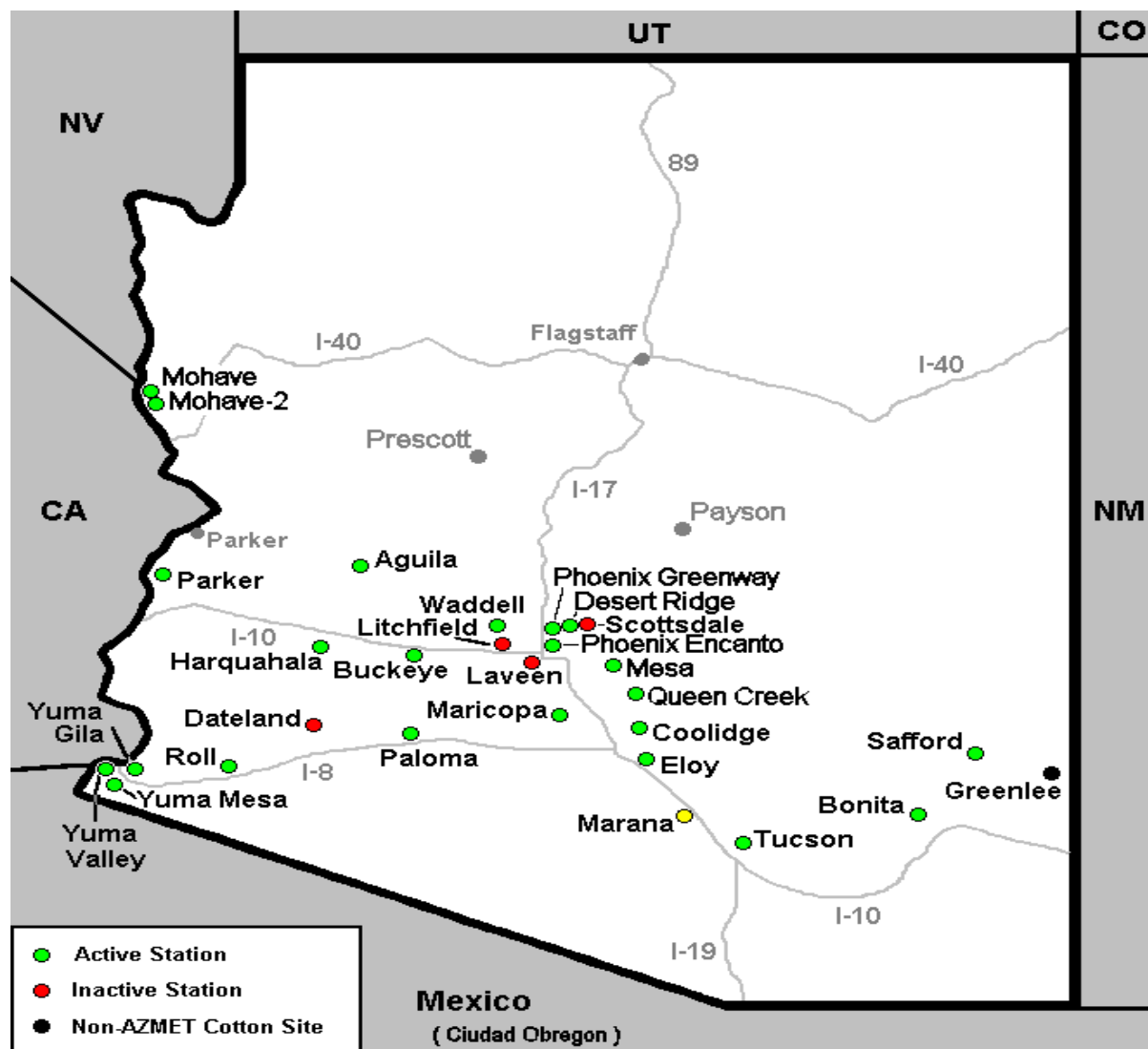
According to a representative of ASU's Data Communication Operations department, ASU internet service provision has dwindled from approximately 90 off-campus sites three years ago to just 16 as of summer, 2003.

The University of Arizona also provides internet access to the following Agriculture Network sites:

**CALSNET, College of Agriculture and Life Sciences Network, University of Arizona**

Yuma County connections:

UNIT	LOCATION	LINK METHOD
Yuma County	2200 W. 28th, Yuma	T-1 Wireless/Beamspeed
Yuma Mesa Ag Center	RR1, Box 40M, Somerton	T-1 Wireless/Beamspeed
Yuma Valley Ag Center	6425 W. 8th St., Yuma	T-1 Wireless/Beamspeed

**AZMET: The Arizona Meteorological Network**

**AZMET is a service of the University of Arizona Cooperative Extension program.** The following information about AZMET is from a description on the AZMET Website (<http://ag.arizona.edu/azmet/>):

The Arizona Meteorological Network (AZMET) provides meteorological data and weather-based information to agricultural and horticultural interests operating in southern and central Arizona. Meteorological data is collected from a network of automated weather stations located in both rural and urban production settings. Meteorological data collected by AZMET include temperature (air and soil), humidity, solar radiation, wind (speed and direction), and precipitation. AZMET also provides a variety of computed variables, including heat units (degree-days), chill hours, and reference crop evapotranspiration (ET<sub>o</sub>). AZMET data are summarized in a variety of formats, including several ready-to-use summaries that use English units, and comma-delimited ASCII text files that can be imported into most database and spreadsheet programs. Special reports generated by AZMET include the Phoenix Area Turf Water Use Report and Weekly Cotton Advisories (generated Mondays from February through August). AZMET began operating on Jan 1 1987.

### **Arizona Western College / NAU - Yuma**

Arizona Western College was the first community college established under the Arizona Community College Law of 1960. In 1961 an overwhelming majority of the electorate of Yuma County approved the establishment of a community college district. The College became the first Institution of higher education established in Arizona since 1921, enrolling its first students in the fall of 1963.

The College District encompasses 10,000 square miles, the size of the original Yuma County; however, in 1983 northern Yuma County voted to form its own county, creating La Paz County. Thus, the college now serves two counties with a population close to 200,000.

In 1988, Northern Arizona University and Arizona Western College entered into a collaborative agreement to bring comprehensive post-secondary education to southwest Arizona. Students throughout the area have benefited from the opportunity to attain associate, baccalaureate, and masters' degrees at the AWC campus near Yuma. The two schools share classrooms, library resources and faculty members to provide a variety of services to students enrolled in both institutions. In 1996, the University of Arizona, Arizona Western College, and Northern Arizona University began a cooperative baccalaureate degree in Agricultural Systems Management.

Arizona Western College and Northern Arizona University – Yuma share a campus and provide what has been called a 2 plus 2 higher education opportunity. Students can complete a two year degree at AWC or complete the first two years of a four-year program at AWC and then, on the same campus, progress to junior and senior years and completion of a four year degree under the auspices of NAU-Yuma on the same physical campus.

AWC/NAU-Yuma offers a mix of educational, career, and lifelong learning programs on their Yuma campus, via internet-based programs, mixed media courses (cable/internet), cable

telecourses, and via classroom and ITV distance learning at several sites in Yuma County and at the AWC facility at Parker in La Paz County. These locations include The AWC Career Center (1351 S. Redondo Center Dr., Yuma; <http://www.awccareercenter.org/>); Dateland School; Antelope High School (Wellton); Somerton Middle School; San Luis Middle School. There is a T-1 link to Fire Station #5, adjacent to the AWC/NAU-Yuma campus for training and course delivery there. AWC provides some classes at community locations such as the Quartzsite Library in La Paz County.

The AWC/NAU-Yuma campus gets its internet connectivity via a 3 Mbps connection (dual T-1 Frame Relay) to Northern Arizona University. The campus has T-1 point-to-point links to the AWC Career Center, Fire Station #5, the San Luis Middle School, and Somerton Middle School. AWC/NAU-Yuma shares a T-1 link to Antelope High School in Wellton with the Arizona Public Schools Computer Consortium (APSCC), a K-12 buying cooperative that administers a cooperative purchasing agreement among public school districts, county school superintendents, and Northern Arizona University. Classes offered at the Dateland school do not use ITV or the school's satellite internet connection. AWC maintains a microwave-based WAN connection (768 Kbps) to its Parker campus in La Paz County. A gigabit fiber optic network links buildings on the main campus of AWC/NAU-Yuma.

In September of 2003, AWC announced that the college had won \$5.3 million in individual and cooperative Title V grant funding. Among other uses, the grant funds will support the expansion of internet delivered educational programs and an upgrading of the school's distance learning infrastructure:

#### **Arizona Western College Awarded Over \$5 Million in Grants**

Yuma, Arizona – Sep 15, 2003 -- Arizona Western College has been awarded over \$5.3 million for two grants from the U.S. Department of Education. The title of the grants, Strengthening Hispanic-serving Institutions, falls under Title V of the Higher Education Act. Both grants will focus on increasing retention and completion rates for underserved and low-income student populations. The individual grant, just over \$2 million, hopes to accomplish this by developing several accelerated degree programs that incorporate a competency-based approach that uses distance learning strategies in order to overcome location barriers and time constraints. AWC also plans to incorporate faculty and staff development to encourage a culturally sensitive classroom environment. The cooperative grant awarded to the partnership of Northern Arizona University-Yuma and AWC was awarded over \$3 million and will specifically focus on providing significant resources to develop the distance-learning infrastructure for both schools.

[-- From a release posted on the News section of the AWC website:

<http://www.azwestern.edu/news> ]

## **10.4 LIBRARIES**

The Yuma County Library District (YCLD) aggregates the connectivity of seven locations (Main Library, Foothills – Yuma, Dateland, Roll, Somerton, San Luis, and Wellton) into a single connection to the Yuma Educational Consortium for internet access. The Library District uses a centralized catalog system (SIRSI) that depends on sufficient bandwidth and reliable internet connectivity for everyday operations. Yuma High School libraries and Arizona Western College

library also use online catalog systems from the same vendor as YCLD – SIRSI. This makes it easier for libraries to deliver combined searching capabilities from their systems. Patrons at all branches of the Yuma County Library District can search in their library or home for holdings at the following sites:

Academic library, Arizona Western College  
Dateland  
Foothills Branch  
Hyder School District  
La Paz Campus at Parker, AWC  
Main Yuma Library  
Mohawk Valley School Library  
Roll Branch Library  
San Luis Branch  
Wellton Branch  
Somerton Branch

Patrons can access their accounts, place holds, suggest new purchases, renew items, request interlibrary loans, and more, all online at <http://yumalibrary.org/>. The library also subscribes to a number of databases that are available within the libraries and online:

- [INFOTRAC DATABASES](#): (requires library card number)  
Databases are: Custom Newspapers, General Reference, Health and Wellness Resource Center, Literature Resource Center, Business and Company Resource Center, InfoTrac OneFile, Opposing Viewpoints, Biography Resource Center, Informe, and What Do I Read Next.
- [INFOTRAC DATABASES in Spanish](#): Custom Newspapers, InfoTrac One File, and Informe are available in Spanish.
- [PROQUEST DATABASES](#): (login required).  
A Business and Trade database.
- [AUTHORS 4 TEENS](#): Information on authors and books suited for teens
- [CHILTON'S AUTO REPAIR](#): (requires library card number) Auto repair information.
- [ARIZONA HEALTH INFORMATION](#): State and local health portal to access local, state, and national information on individual, clinical, and community health related topics.

In most communities, the local library branch may be the only public site that provides free internet access. In practice, there is a strong demand for access to internet-linked PCs in public libraries, and libraries are seeing increasing amounts of their traffic coming from public access internet users. Students, who usually have very structured and time-limited access to the internet at their schools, can visit the library after school for additional, relatively unstructured network access (still time limited, however). Others use the terminals for e-mail, serious research, or just browsing topics of interest. Libraries typically operate formal registration processes to control access to these network-linked computers, with limitations in time and formal user agreements that attempt to control abuse of these privileges.

The downside of public access internet at public libraries is that when the public access terminals are in heavy use, staff use of administrative functions, such as catalog maintenance, may slow due to bandwidth limitations of the library connection. Also, public internet access takes up space that could otherwise be used for other, more traditional library uses, such as shelving, public meeting spaces, and quiet areas. The recent introduction of compact flat panel display screens offers the only opportunity for libraries to gain space for their otherwise crowded public access terminal areas.

In response to the CTA survey, YCLD reported satisfaction with its Yuma Educational Consortium (YEC) internet link, a high level of satisfaction with YEC technical support, and some concerns about future growth:

“At present we do not have any issues with our current providers. Not having a choice is always a concern and no competition drives the price up. We have 5 frame relay T-1 lines and pay about \$2000 per month. We always have to be concerned about network resources and do not allow our users access to audio or video or any downloads. For right now we have the speed we need, but our service is growing by leaps and bounds. We want to be able to, in the near future, tie all our locations together with voice over IP and that certainly will take up some of our resources. It would be great to have excess resources but the cost is always a concern. We get our access through the Yuma Educational Consortium and I am concerned that they be able to get what they need to provide good access for all the Yuma County schools and all the libraries.

We are a secondary tax district and we have to be very careful with our tax dollars. We do not get rate increases so each year we have to do more with less. Computer access is very important to our residents. Many families that we provide service for do not have access to computers in the home. [This] provides a demand...that we need to keep up with and try to meet. E-rate funds take the sting out of our telecom costs and allow us to bridge the gap between need and reality.”

Performance of the library network is closely monitored, and is reported to be adequate, although there are some concerns about the eventual need to grow beyond T-1 connectivity. One branch, in Dateland, appears to have some problems that may be due to latency issues of its satellite connection (an OptiStreams T-1 equivalent). Dateland is served by the Arizona Telephone Company, a subsidiary of TDS (Telephone and Data Systems Inc.; <http://www.teldta.com/>) that reportedly declined to upgrade their local switch to digital service to provide T-1 service to local schools, necessitating their use of satellite. YCLD library locations, connectivity, costs, SLD discount rate, and number of public access terminals are shown on the following table:

<b>SITE</b>	<b>CONNECTIVITY</b>	<b>MONTHLY COST</b>	<b>ANNUAL COST</b>	<b>E-RATE DISCOUNT (2003)</b>	<b>PUBLIC ACCESS TERMINALS</b>
YCLD internet Access	T-1 (from Yuma Educational Consortium)	\$ 833.33 (cost includes a full T-1)	\$10,000	80%	
Yuma County Library District	T-1 Frame	\$ 520.77	\$ 6,250	80%	40



Main Library					
Foothills Branch (Yuma)	T-1 Frame	\$ 361.19	\$ 4,335		7
Somerton	T-1 Frame	\$ 361.19	\$ 4,335		11
San Luis	T-1 Frame	\$361.19	\$4,335		14
Wellton	T-1 Frame	\$ 361.19	\$ 4,335		23
Roll (shared public/school library)	T-1 Frame	\$ 361.19 *	\$4,335		3
Dateland (shared public/school library)	T-1 Satellite (OptiStreams)	\$1,260* (approx.)	\$ 15,120 (approx.)	90%	3
<b>TOTAL (YCLD)</b>		<b>\$2,798.86</b>	<b>\$33,586.32</b>	<b>80%</b>	<b>101</b>
<b>TOTAL</b> (* = K-12 shared)		\$1,600 (approx.)	\$19,500 (approx.)	90%	

In addition to the expenditures listed in the table, YCLD spends approximately \$1,500 per month on long distance, cellular, and pager services.

YCLD is a component of the Yuma Educational Consortium (YEC) Community Library and Media Center, which provides a seamless interaction between local library agencies. The YEC Community Library and Media Center is comprised of the seven YCLD facilities, the Northern Arizona, Yuma Campus/Arizona Western College library (a single combined facility), and four Yuma Union High School District #70 facilities (with a web interface behind the firewall at the high school district; <http://209.180.153.10/>).

The AWC/NAU-Yuma Academic Library serves the campuses of Arizona Western College and Northern Arizona University-Yuma, including Distance Education students. The Academic Library website at <http://www.azwestern.edu/library/> also provides links to the NAU Cline library catalog and more extensive reference resources. The Academic Library Oasis online catalog search screen is identical to the YCLD search screen and includes the capability to search for holdings at the AWC La Paz Campus in Parker, north of Yuma County.

The Yuma County Library District and the Arizona Western College Library are also participants in the Arizona EDIC Program (Economic Development Information Centers), part of a statewide program serving the business development resource needs of the community. Participating libraries maintain a core collection on economic development that includes basic information on business, economic development in Arizona, demographics, marketing, finances, and "how to" materials aimed at small business.

Yuma County Libraries received a total of \$41,068 in an E-rate telecom services and internet access subsidy for the E-rate 2003 funding cycle, year 2003 (7/1/2002 to 6/30/2003) at a discount rate of 80%. The two school districts, which provide shared library service for YCLD, received E-rate subsidies at a 90% discount level are Dateland, which received a funding commitment of approximately \$25,000, and Roll which received an E-rate funding commitment of approximately \$13,700.

There are three other "Public" libraries in the county: The Yuma County Law Library; the Arizona Historical Society Library (web pages at <http://yumalibrary.org/ahs/index.htm>); and the Marine Corps Air Station Library.



## 10.5 MEDICAL/HEALTH

Health care is a critically important segment of rural economies, particularly in times of economic downturn (when healthcare needs and expenditures typically rise). 1998 per capita spending on healthcare in Arizona was estimated to be \$3,100 per resident.

[http://www.stopgettingsick.com/templates/news\\_template.cfm/5989](http://www.stopgettingsick.com/templates/news_template.cfm/5989)

A more recent national estimate of total U.S. health spending (2002) is \$5,427 per capita, with government's share being \$3,245 (primarily Medicare/Medicaid).

<http://prorev.com/statshealth.htm>

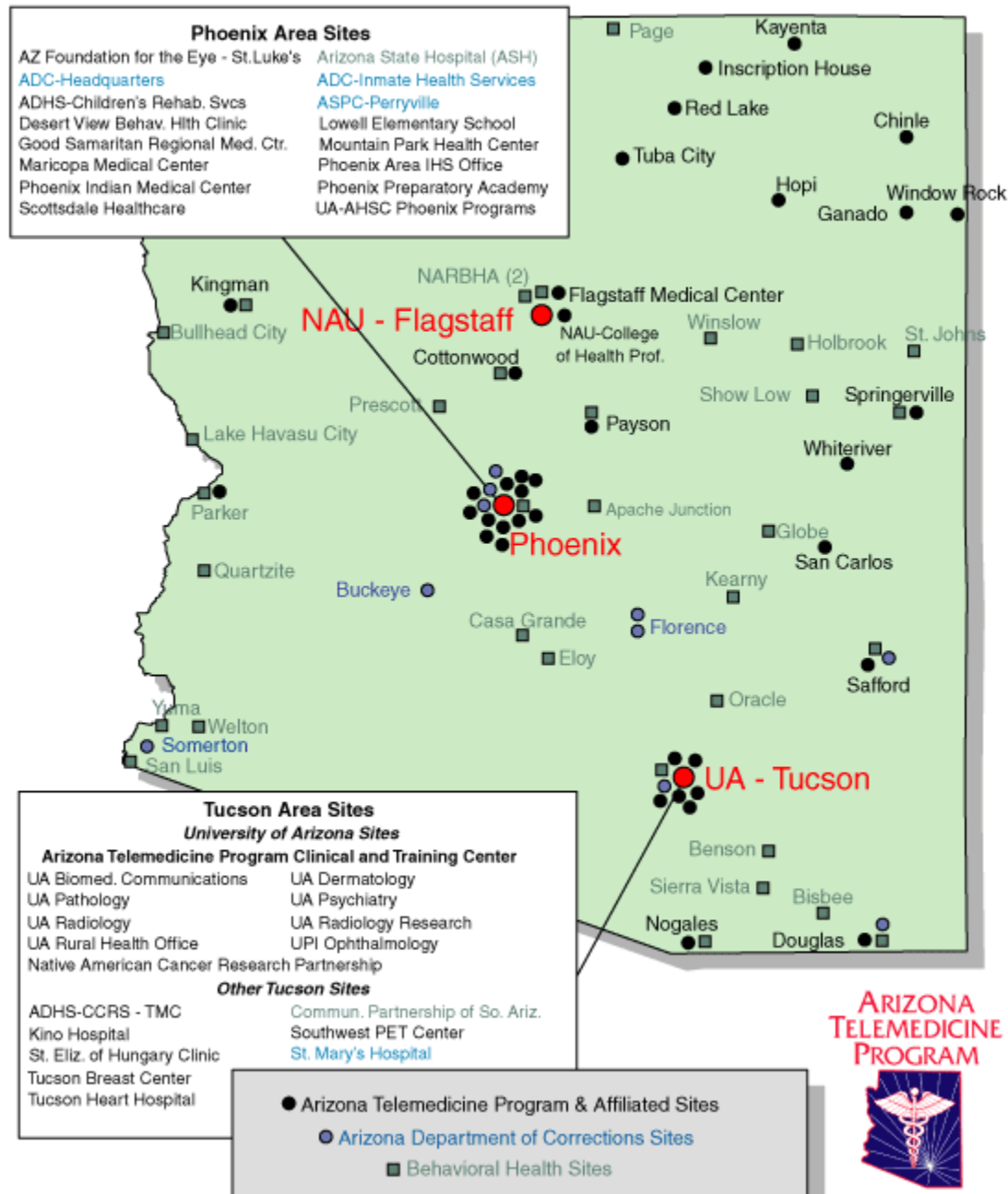
That amounts to approximately \$921 million dollars when multiplied by Yuma County's 2002 population estimate of 169,760.

The challenge to rural communities is to keep this money in the county, or in the case of Medicare/Medicaid, return this money to the county by having a robust local health care business environment that can contribute its revenue to the local economy in the form of quality jobs/salaries, supply and service purchases, and other positive benefits. According to the Colorado Rural Health Center (Snapshot of Rural Health in Colorado, 2003), health care can represent up to 20% of a rural community's employment and income, on average. Telecommunications infrastructure can help rural hospitals survive, sustain the quality and responsiveness of their services, and build revenue. And, last but not least, adequate health care services are critically important to the issue quality of life (particularly for children and seniors) and attracting new business and population growth.

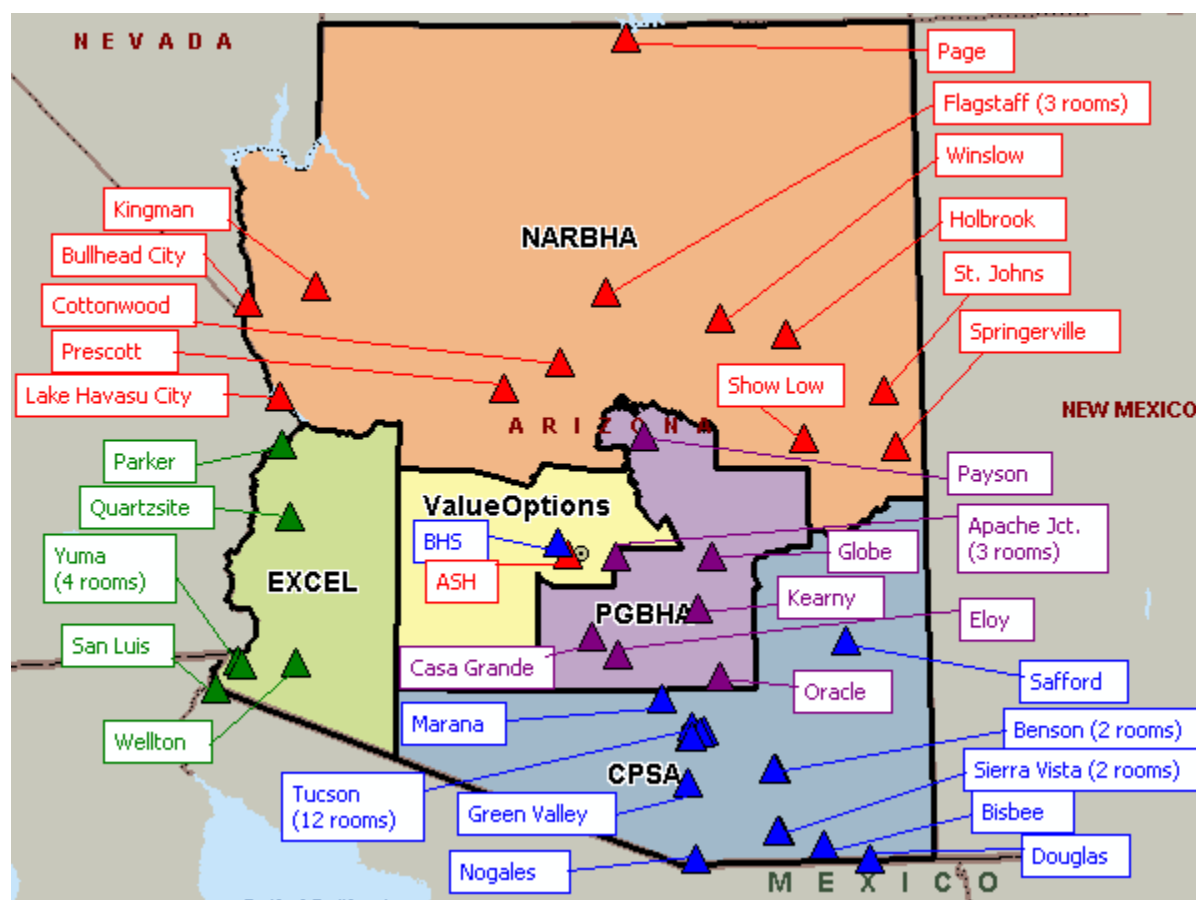
Yuma County is benefited by the existence of a thriving regional medical center. Alliances with the University of Arizona Health Sciences Center in Tucson and/or Northern Arizona University could enhance development of telemedicine applications at Yuma Regional Medical Center and for specialty physicians in the Yuma area.

Telehealth/Telemedicine is an attractive benefit for improved community connectivity, but the financial model for implementing and sustaining it is weak in rural areas where population density is sparse and capital funds for investment in the equipment and circuits necessary may be better used for something else. Reimbursement issues (who will reimburse for what and at what level) and the influence of shifting business and referral network alliances for rural sites, also act to limit telehealth development.

# Arizona Telemedicine Networks



## AZ TeleBehavioral Health Network



The Arizona TeleBehavioral Health Network was developed to provide clinical behavioral health services and related activities (administrative and training/education meetings) via live, interactive videoconferencing. As Northern Arizona Regional Behavioral Health Authority (NARBHA) assisted with each Regional Behavioral Health Authority's (RBHA's) telemedicine network development, it quickly became apparent that there was a need to coordinate telemedicine efforts, at least across RBHA boundaries.

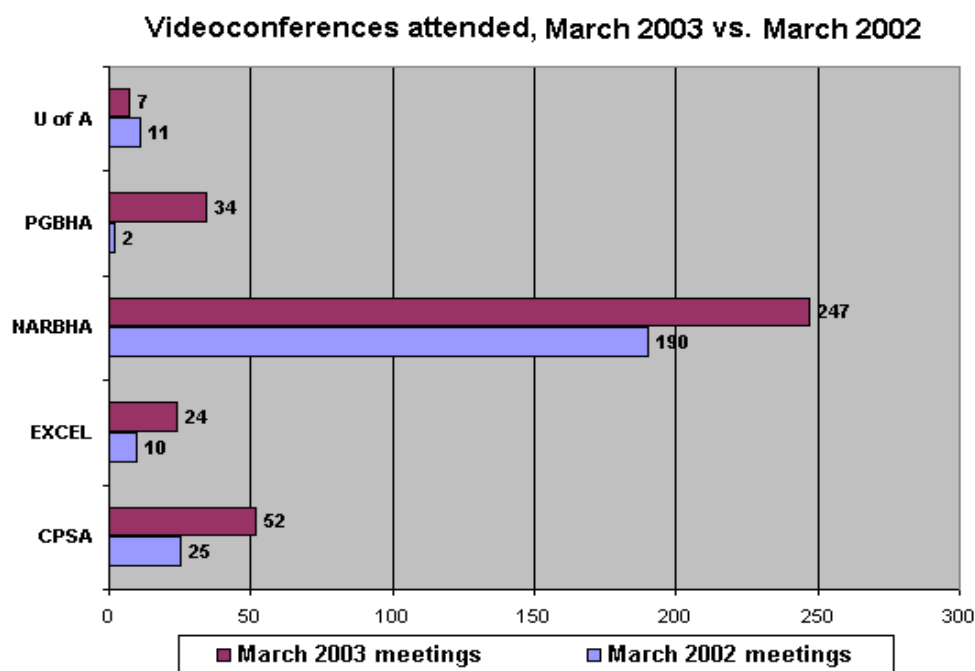
An advisory committee of the Arizona TeleBehavioral Health Network, consisting of representatives from each member agency, meets quarterly to make decisions regarding oversight, expansion, funding, future plans, legislation, public relations, network additions and deletions, changes, how those costs will be covered, and other business matters related to this effort.

In January 1996, NARBHA received funding from the Arizona Department of Health Services to develop a telemedicine system that would enhance the delivery of behavioral health services throughout 62,000 square miles of northern Arizona. The system, NARBHA net, began operation in November 1996, using dedicated T-1 lines between sites and connecting to a hub in Flagstaff.

The first NARBHA sites designated for videoconferencing were Flagstaff, Show Low, St. Johns, Page, Prescott, and a site at the Arizona State Hospital (ASH) in Phoenix. Since then, two additional sites in Flagstaff, along with sites in Holbrook, Kingman, Lake Havasu City, Bullhead City, Cottonwood, Winslow, and Springerville have been added.

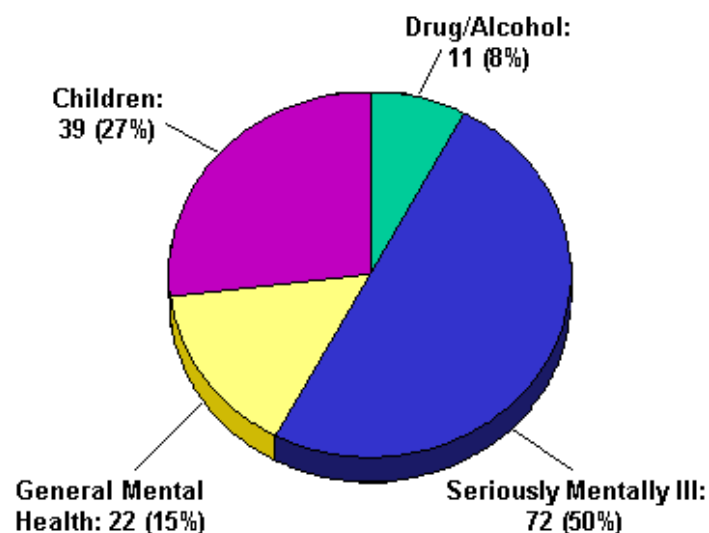
In mid 1998, NARBHA assisted another one of the Regional Behavioral Health Authorities, Community Partnership of Southern Arizona (CPSA), in bringing up its own multi-site network. The two RBHA networks are linked at the Division of Behavioral Health Services (DBHS) in Phoenix, providing a seamless connection between networks. In fall 1998, a third RBHA, Pinal Gila Behavioral Health Association (PGBHA), linked one site in Apache Junction to NARBHA net, becoming part of the growing statewide RBHA network.

In November 1998, NARBHA net established a permanent connection with the University of Arizona's Telemedicine Program, based in Tucson. With this connection, NARBHA has been able to offer its clinics the opportunity to participate in regularly scheduled psychiatric grand rounds and specialty physician consulting. NARBHA and the University of Arizona jointly applied for a grant for shared sites at medical facilities in Whiteriver on the Apache Indian Reservation (1999) and the new Hopi Medical Center in Polacca (2001).



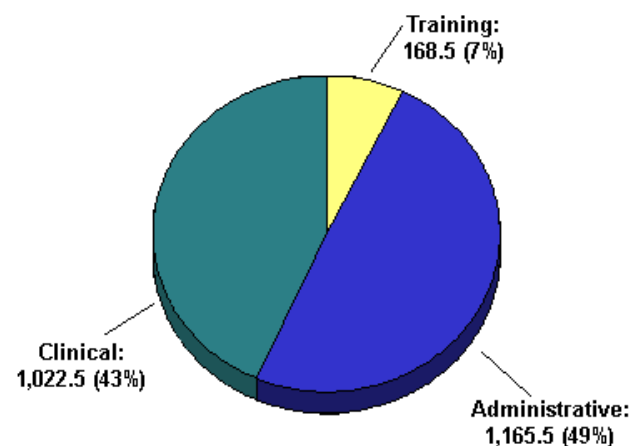
Below are NARBHAnet telemedicine statistics depicting the number of telepsychiatry members served (by program) and the types of videoconferencing activity for all NARBHA sites (Flagstaff, Winslow, Holbrook, Show Low, Page, Prescott, St. Johns, Springerville, Kingman, Bullhead City, Lake Havasu City, and Cottonwood).

**NARBHA Telepsychiatry Members Served\***  
(by program - monthly average)  
January - March 2003

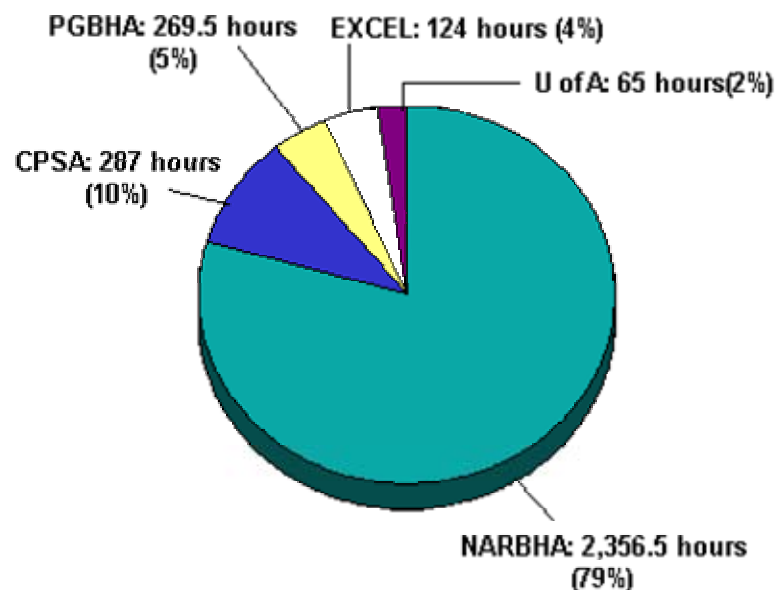


\* Actual number of members served per month is higher than shown here due to lags in reporting

**NARBHA Net Videoconferencing Activity**  
(number of hours spent in videoconferences)  
January 1, 2003 - March 31, 2003



The chart below shows use of the NARBHAnet system by all Arizona Regional Behavioral Health Authorities (RBHAs) during the period January 1, 2003, through March 31, 2003.

**Arizona RBHAs****Use of NARBHAnet****January 1, 2003 - March 31, 2003****(In Hours)**

*NARBHA uses Polycom video equipment that was purchased through Wire One Technologies, Inc. The equipment is capable of delivering two-way, interactive video, videotape recordings, and computer presentations. A remote-control unit controls the equipment during use. The camera can be programmed for preset room locations, can be voice-activated, and can be controlled by remote sites (which is useful in delivering psychiatry services).*

*Any network site can schedule and initiate a videoconference. NARBHA also has the capability to add cascaded sites from other networks broadcasting at differing bandwidths to videoconferences held over the network, and up to four sites can be viewed at the same time with split-screen capability. The system was designed to be user-friendly and does not require technical staff at remote locations. In addition, the system was designed to be flexible, allowing all sites to participate in a single conference, or combinations of multiple conferences occurring simultaneously.*

*Network end-user sites are equipped with Adtran TSUs accepting the T-1 line from Flagstaff, which feeds into the router, where the T-1's 24 channels are split out for video, data, or voice. The video equipment located at the majority of the NARBHA sites is CLI Radiance 8750s and 8775s, with one VTEL TC2000 and four Polycom Viewstation FXs. These room video units are all equipped with a television monitor and a codec, which translates analog signals into digital signals for transmission over a T-1 phone line, and back again for receiving. This allows a two-way, live interactive video transaction.*

*Fifteen northern Arizona sites are currently connected to NARBHA net over private, dedicated T-1 phone lines. The network also has the capacity for two primary rate interface (PRI) call connections to the outside world, and includes T-1 lines to NARBHA's partner agencies. These include one full T-1 path to the Community Partnership of Southern Arizona (CPSA)*

*telemedicine network with multiple sites (including the Department of Behavioral Health Services); three full T-1 paths to the Apache Junction hub of the Pinal Gila Regional Behavioral Health Association (PGBHA) eight-site network; one full T-1 path to the Yuma hub of the EXCEL group six-site network; and one full T-1 connection to the University of Arizona's Arizona Telemedicine Program in Tucson.*

*All 15 of the NARBHA network sites are internal inverse multiplexer connection type; the U of A is a direct connection. The hub location in Flagstaff houses a N.E.T. IDNX 90 Prime Video Switching system, which allows for private video and data network connections, configured for both on- and off-network video dial-up capability. Dedicated T-1 phone lines from each of the remote site locations connect from local telecommunication carriers into the hub through Adtran TSUs, which carry those 24 channel sets into the IDNX 90, where those 24 channels are then split out, dedicating eight channels for video for each site, one D-channel, and the remaining 15 channels for data and voice applications. The eight consecutive video channels with the one D channel (for voice and video switching) are then fed into the MultiPoint Conferencing Unit (MCU) bridging device, a software-controlled switching device that interconnects H.320-compliant conferencing systems. This MCU permits all 15 sites, as well as sites on connected networks (PGBHA, EXCEL, CPSA) and up to two outside agencies (such as hospitals, universities, out-of-state agencies, or clinics) to participate in any combination of multi-site videoconferences that T-1 bandwidth allows.*

<http://www.rbha.net/overview.html>

Bandwidth is important for any health care application in rural communities, but it is critically important for more advanced telehealth/telemedicine applications such as teleradiology. Here, for example, is a table of estimated transmission times for a range of connectivity bandwidths:

<b>Time required to download a 24 megabyte file of X-ray images</b> (from the Main Street Economist, "The Broadband Quandary in Rural America," August, 2000)	
<b>SPEED</b>	<b>TIME</b>
14.4 kbps	3.6 hours
28.8 kbps	1.8 hours
56 kbps	58 minutes
128 kbps	24 minutes
1.54 mbps (T-1)	< 3 minutes
4 mbps	48 seconds
10 mbps	< 20 seconds

As a practical matter, T-1 or fractional T-1 is the only viable bandwidth for applications which require transmission of large files. There are products and services on the teleradiology market that operate at ADSL speeds, and historically, there are some non-radiology telehealth applications, such as home monitoring of pacemaker settings, which have used devices as slow as 150 baud acoustic-coupled modems.



## Hospitals

### Yuma Regional Medical Center

YRMC is a sizable regional medical center which is currently undergoing expansion. This well-staffed, well-equipped medical facility is large enough to obviate the need for extensive telemedicine applications. However, the pediatricians, and especially the pediatric cardiologists, have expressed an interest in establishing a network link to the University of Arizona Health Sciences Center for diagnostic support. This link was recently effectuated to transmit echocardiography data for remote evaluation by specialists at YAHSC.

The hospital provides access via T-1 lines, to a physicians' information service. It also provides T-1 teleconferencing capability for physicians to access continuing education programs. There is not yet a similar program in place for the nursing staff although one is anticipated in the future.

The hospital owns 12 strands of fiber which run from the hospital site to its corporate administration center some distance away. The medical center also contracts with Qwest for a dedicated T-1 connection for diagnostic imaging applications at its Foothills satellite clinic and maintains a T-1 dedicated line to St. Joseph's Hospital in Phoenix for nighttime wet-read x-ray back-up. YRMC provides for ISDN connectivity for radiologists and certain other physicians to home and office locations and maintains a VPN access for medical records and case management. There is a dedicated T-1 line to the 4<sup>th</sup> Avenue Wellness Center in Yuma.

The hospital would like to provide internet VPN access for its school nurses who are located throughout the Yuma County region. The YRMC is also developing a comprehensive, interactive website for patients which will allow for virtual follow-up visits as well as billing management and access to disease management information.

The Yuma Regional Medical Center is a sophisticated consumer of technology and its current bandwidth demands, while mostly being met internally, are high and with planned expansions into the Foothills site east of Yuma, and desired additional applications, the demand is expected to grow significantly, making future demand very high.

## Clinics

### Sunset Community Health Center

This health center has clinic sites in San Luis, Somerton, Wellton and two sites in Yuma. The clinics provide urgent care, women's care, geriatric, chronic disease management, infant and pediatric visits, as well mental health care. The Wellton and San Luis sites provide for mental health consults via video-links using H.320 technology on the NARBHA network. Other applications are minimal, but the clinics would benefit from expanded broadband capacity, especially for medical records management. These clinic sites are assisted by the Yuma County Medical Collaborative, an extensive partnership dedicated to ensuring access to quality medical care for the entire county.

### Yuma County Medical Collaborative

The Yuma County Medical Collaborative is a multi-partner effort to provide a medical 'safety net' for all of Yuma County's residents and laborers. Partners include the state and county health departments, numerous physician practices and specialty groups, mental health providers, Sunset Community Health Center and the Yuma Regional Medical Center. While the

Collaborative itself does not maintain active clinic sites, it lends assistance to the Sunset Community Health Center network of rural clinics in southern Yuma County.

## 11.0 DESCRIPTION OF APPLICATIONS

### 11.1 E-GOVERNMENT

Simply put, "e-government" means putting information about County and local government online, ideally with fresh reporting of things such as minutes of public meetings and other news items. Some more advanced e-government systems make all forms or application processes available (downloadable or web-based forms) online. There are even hybrids of Adobe acrobat forms which can be downloaded, filled in on a computer, and e-mailed or uploaded.

Beyond a simple website, however, e-government requires expensive hosting, application software, additional staff time, and technical staff support or outside consulting assistance just to get started.

Some government functions, such as tax lien auctions, might benefit from the greater exposure available on the net. Visibility of the website may help in promoting business and residential relocation, particularly if the government entity may be offering some sort of inducements for relocation or if it seeks to promote an airport site, industrial park, or commercial property.

A 2001 study by the University of Maryland reported increasing popularity of e-government usage, with rural users "the most likely to conduct government business online." ("US Net Users Turning To E-government"; E-gateway, 1/18/2002; <http://www.e-gateway.net/infoarea/news/news.cfm?nid=2132>)

To sum up, some coordinated form of internet presence should be done by all municipal and county governments. If it is done, it should be done well, with a well defined selection of useful information for residents, updated regularly, and some information about relocation. Ideally, the county would host a web portal, a sort of one-stop site for access to information about the county, municipalities, and local resources. Both Yuma County and the City of Yuma have competent IT departments and staff that may provide a source of assistance in establishing a basic e-government presence for the smaller communities with limited staff and resources. However, there will be costs and it can get very expensive if the web sites become too elaborate.

### 11.2 DISTANCE EDUCATION

Distance education includes many things: interactive videoconferencing, streaming media, library network access, and web-based interactive instruction. In its most attractive form, distance education is high-quality real time video interaction between two or more sites. Unfortunately, the infrastructure to deliver this ideal service is not universally available, and in a few places where it is available, it may be priced out of the reach of potential users. In the real world, distance education is typically done within a patchwork of environments shaped by previous grant awards and limitations of previous evolutions of the technology, limited also to a regional or local proximity by programmatic traditions and other resource sharing affiliations.

Even so, given the limitations of an evolving infrastructure, Arizona is very close to the time when K-12 students, vocational/technical education students, college students and "lifelong learners" can enjoy a much greater variety of options for enhancing their educational environment both at school and at home. High school students in Yuma County, for example,

can take web-based advanced placement courses from WAC/NAU or one of the other state university programs, or from Arizona Regent's University (<http://www.arizonaregentsuniversity.org/classes.htm>). Also, as high bandwidth access such as DSL and cable modem begin to appear in homes, the quality and number of options (such as streaming media and real time videoconferencing) for distance education increase.

There are three general categories of distance education commonly available:

1. Web based education systems, either as virtual K-12 schools (popularly called "cyberschooling"), the personal computer-facilitated equivalent to home schooling, as a supplement to traditional classroom schooling, or as a home aid for completing high school requirements or college level study toward certification or degree. These systems require only an adequate dial-up connection;
2. Remote, interactive video classrooms, typically sharing physical locations and network connectivity (wired, fibered, wireless, or satellite) with other educational or public institutions;
3. Broadcast, cablecast, or satellite-delivered video education programs for use at home or in schools.

### **Web Based School Systems: K-12**

Virtual K-12 schooling programs in Arizona are part of a multi-year pilot experiment called the Technology Assisted Project-based Instruction Program (TAPBI). TAPBI was established in HB 2093 (see Appendix E for the legislation text and notes). In 2003 the program expanded from four schools - two charters and two district schools - to 14 in all and restrictions on enrollment were lifted. No total enrollment figures are publicly available for the TAPBI program, and individual school enrollments are available only in a few cases where the distance learning charter has submitted data that is reported in an SAIS school report card.

There are currently no Yuma County school districts originating virtual school programs.

### **Distance learning schools in Arizona as a result of HB2093:**

The following schools were approved to participate in the Technology Assisted Project-based Instruction Program as described in HB 2093. The Arizona Department of Education maintains one brief web page of information on virtual schools at:

<http://www.ade.az.gov/stateboard/tapbi.asp>

#### Districts that Provide Distance Learning

1. Mesa Distance Learning Project, Mesa Unified District - <http://www.mdlp.org/>
2. Deer Valley Unified - Phoenix Special Programs and Academies - <http://www.phoenixacademies.org/programs/sites.cfm>
3. \*Peoria Unified District – eCampus - <http://ecampus.peoriaud.K-12.az.us/>
4. \*Tucson Unified District – <http://www.tusd.K-12.az.us/>
5. \*Tempe Union High School District - [http://www.tuhsd.K-12.az.us/tuhsd\\_main/index.html](http://www.tuhsd.K-12.az.us/tuhsd_main/index.html)

\* = Newly approved August 25 2003

**Charters that Provide Distance Learning**

1. PPEP TEC & Affiliates - Arizona Virtual Academy (Tucson; 2003 enrollment: 300+?) - <http://www.azva.org/> (PPEP TEC has charter sites in Yuma County.)
2. Sequoia Choice School - Arizona Distance Learning School (Mesa; 2003 enrollment 166) - <http://scazdl.org/sc/index.html>
3. Sierra Vista Charter School, Inc. - Connections Academy (Phoenix; 2003 enrollment: 90) <http://www.connectionsacademy.com/state/home.asp?sid=az>
4. Phoenix Special Programs, Inc. – Kids Hope Academy (Phoenix; 2003 enrollment: 4) <http://www.phoenixacademies.org/programs/sites.cfm>
5. Humanities and Sciences Academy of the United States, Inc. – Humanities and Sciences Academy of Arizona (Tempe; 2003 enrollment 122) - <http://www.humsci.org/main.asp?page=hsaa>
6. Pinnacle Education, Inc. - Virtual High School (Tempe; 2003 enrollment: 35) - <http://www.pin-ed.com/virtual.asp>
7. Primavera Technical Learning Center – Primavera On-Line Learning Center (Chandler; 2003 enrollment: 70) <http://www.primaveratech.org/>

Although K-12 virtual schooling is still in its infancy in Arizona, it holds both great promise and some risk for rural communities. The great promise is that it can help alleviate one of Arizona's most pressing educational problems -- its rate of high school completion, which as recently as 2002 was ranked 50<sup>th</sup> (worst) in the nation ([http://www.aeanet.org/PressRoom/idmk\\_CyEd2002\\_Arizona.asp](http://www.aeanet.org/PressRoom/idmk_CyEd2002_Arizona.asp)). The web-based instruction of virtual schools can help expand the number of at-home schooled special populations, such as kids who have behavioral or social problems with traditional schooling, pregnant teens, students prevented from attending school due to illness or injury, and others. Among the beneficiaries of virtual schooling may be the children of migrant agricultural workers who may look forward to better continuity and tracking of their educational services and avoid the problems caused by frequent changes of school and other interruptions. But there is also a downside to virtual schooling: the risk that as it grows in popularity it will redirect state education funding necessary to support the local traditional educational infrastructure.

Currently, there are no virtual schools programs in Yuma County, so virtual schools outside Yuma County that enroll pupils from Yuma County would receive approximately \$5,000 per student -- money that might otherwise have gone to support services at a local school. Long term, the effects of the growth of virtual schooling could negatively impact economic development by draining funding (and resulting employment) away from local schools. This is more critical in the most rural communities in Arizona where school jobs are among the best and most stable employment opportunities. Note that there does not appear to be a public reporting system for virtual school enrollment that tracks students by location, so it is currently not possible to determine how many "virtual" K-12 students there are in Arizona by county.

**Web Based School Systems - Higher Education**

To anyone who attended a college or university ten or twenty years ago, technology applications that are becoming common on higher education campuses, such as wireless classrooms, faculty-student electronic communication, and electronically delivered courses are astounding. Even more amazing is the potential for institutions to extend their "markets" beyond their geographic locality, literally nationwide. This has brought about interesting branding and intellectual property issues, as well as territoriality issues. Whose students are these anyway?

As with other technology options, higher education distance learning is a two-edged sword. Web based courseware systems allow students who have adequate dial-up access to take courses from hundreds of accredited programs from well-established, well-regarded institutions, as well as from some that are less credible, even if accredited. Students who physically attend universities or college can also take a mix of online and classroom courses to better tailor their schedule, and perhaps not miss a course because of scheduling conflicts or their work responsibilities. This should allow many students who are pursuing degrees part-time to accelerate the completion of their programs.

The tech boom had many bubbles, among which was a "lifelong learning" bubble that presumed that there would be a significant market for corporate sponsored education and training programs. That bubble burst, and the educational training industry refocused on K-12 and more conventional higher education programs. (see "Times tough for e-learning," Jane Larson; The Arizona Republic, Jul. 25, 2003; online at: <http://www.azcentral.com/arizonarepublic/business/articles/0725elearning25.html>).

One indication of the health of the industry and the growth and acceptance of this technology, however, is the recent report by Phoenix-based Apollo Group, Inc. for the year ended August 31, 2003 that showed net income for their **University of Phoenix** Online (Nasdaq symbol UOPX) business increased 71.6% to \$110.5 million, compared to \$64.4 million for the same period last year. University of Phoenix Online is an international program.

A 2002 US News & World Report national directory of E-learning programs profile (<http://www.usnews.com/usnews/edu/elearning/elhome.htm>) of Northern Arizona University (NAU) distance learning services reported that it offers 27 degree-granting online-only programs, 206 credit-granting online-only courses, with a total enrollment of 8,058 students. Arizona State University (ASU) is reported to offer six degree-granting online-only programs, 98 credit-granting online-only courses, with a total enrollment of 3,638 students.

### Remote Interactive Video Classrooms

The pioneering role of higher educational institutions in developing the internet in Arizona, as in other states, resulted in an unusually rich diffusion of innovation, in terms of distance education, to two tiers of constituency: community colleges and K-12 schools. Libraries, museums, and other public institutions benefited as well. The best publicly documented example of this in Arizona is NAUNet, Northern Arizona University's network of distance learning/videoconferencing sites (WAC/NAU and their remote classrooms within Yuma County are a participating NAUNet sites). NAUNet is the backbone of the NAU-Community College Arizona Partnership Plan. Northern Arizona University is working in partnership with Arizona community colleges to deliver fully articulated degree programs using on-site faculty and the interactive instructional television made possible by NAUNet. The following description and illustration shows the extent of NAU's distance learning network:

#### **FACTS ABOUT NAUNET** (<http://www4.nau.edu/iitv/naunet/nnexpfac.html>)

- Current capacity of NAUNet sites is 14,976 (head count) students per academic year.

**THE NETWORK...**is a hybrid of carriage systems and methods, a complex collaboration of

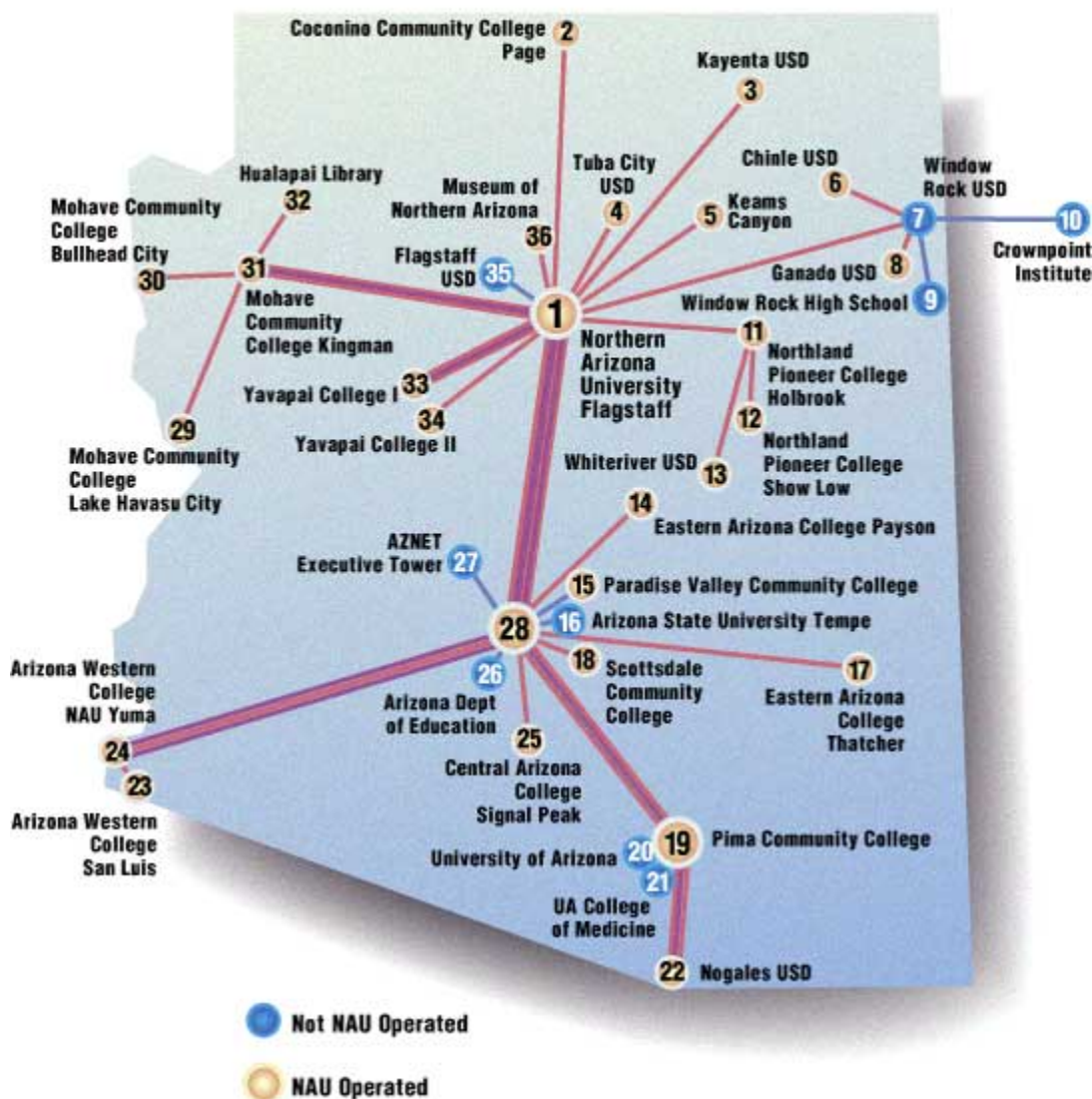


telecommunications providers: MCI, AT&T, US West, Citizen's Utilities, Century Telephone, Spectra Site, and Northern Arizona University.

NAUNet employs first-rate, high quality analog and digital technologies—often mixed together in state-of-the-art applications. Technical terms abound—ISDN, FDDI, Ethernet, internet, Intranet, DS-3, DS-1, modems, codecs, duplex microwave, up-links, down-links—but emerge as a simple-to-use and user-friendly network of highly active communities.

With 34 active sites, NAUNet is the only network in Arizona linking public education and state agency facilities to one another and to many of the state's C-band and Ku-band satellite up-link services, and providing direct links to most of Arizona's major television broadcasting stations and several cable companies.

# NAUNet





All three major research Universities in Arizona have distance learning network programs, but NAUNet may be the most extensive. Community Colleges and other two-year programs also seem to have ambitious distance education programs, as well, often overlapping geographically in terms of market presence and frequently sharing infrastructure, down to the classroom level. In many communities this means several educational options at all levels of education from K-12 onward.

A 2002 US News & World Report national directory of E-learning programs profile (<http://www.usnews.com/usnews/edu/elearning/elhome.htm>) of Northern Arizona University (NAU) distance learning services reported that it offers 68 degree-granting distance education programs, 305 credit-granting distance education courses, and has a total enrollment of 10,419 students. Arizona State University (ASU) offers 7 degree-granting distance education programs, 145 credit-granting distance education courses, and has a total enrollment of 5,182 students. No data were available in the USNWR directory for the distance education program at the University of Arizona.

Northern Arizona University E-learning Web site:

<http://www.distance.nau.edu>

Arizona State University E-learning Web site:

<http://asuonline.asu.edu>

University of Arizona E-learning Web site:

<http://www.eu.arizona.edu/dist>

### **Virtual School Consolidation**

The Arizona Schools Facilities Board Students FIRST Program upgraded most school districts to gigabit-capable WANS with a single internet connection at a "DISTRICT ACCESS POINT" or DAP which is typically at the district office. There has recently been some discussion around a controversial proposal by two State lawmakers to consolidate school districts with a goal of achieving management efficiencies and cost savings. The proposal by Reps. Linda Gray, R-Glendale, and Bill Ko-nopnicki, R-Safford, would form a 13-member commission to study the 236 school districts in the state and come up with a specific plan to create a forced marriage among some of them. That plan would go to the Legislature by the end of 2005, which could approve it as proposed or amended and mandate the consolidation. However, the consolidation proposal has encountered significant opposition, including a negative review from a Goldwater Institute study which found potential cost savings to be miniscule.

Left unexamined is the role high bandwidth connectivity could play in consolidation of educational resources. For example, in Phillips County Colorado, two school districts, Haxtun and Holyoke recently won a RUS grant to establish a gigabit Ethernet connection (provided by their local independent Telco, Phillips County Telephone, a coop) spanning the approximately 20 mile distance between their campuses. This will allow real-time connectivity for classroom education and other purposes between the campuses, including the sharing of certified staff, a key problem rural schools face in the requirements of the No Child Left Behind Act. Awareness of these efforts, applied to the infrastructure issues of rural Arizona, may spur additional State attention to K-12 network infrastructure development.

Also unexamined is the potential for sharing distance learning and videoconferencing capabilities with local governments, a topic which may be addressed by the continuing efforts of the Yuma Technology Coalition.

Yuma County is home to one of the success stories of school district service consolidation in the Yuma Educational Consortium. Its consolidated telecommunications network and other combined services could serve as a model for other rural school district pairs or groupings as the pressure for consolidation and administrative cost efficiency continues in Arizona.

### **Broadcast, cablecast, or satellite-delivered video education**

The current state of broadcast, cablecast, and satellite-delivered video education in Arizona is outside the scope of this report. However, the shift from analog to digital technology (from H.320 to H.323), advances in compression and storage capability and the diffusion of higher bandwidth connectivity is expected to increase the audience for programming that was formerly delivered via broadcast, cablecast, or satellite, toward the long-awaited goal of video on demand (VOD). Internet delivered video (IP Video, H.323), however, still has many performance problems, particularly in networks where latency is poorly controlled (most frame relay networks) and in the heterogeneous environment of new network security controls and the now ubiquitous firewalls.

Ideally, internet-delivered video will allow enhancement of web-based educational systems by allowing students to view (or listen to audio) streaming lectures. Streaming media allows "time shifting" for students who cannot partake of a scheduled interactive video session.

### **Trends**

Western Arizona College and NAU have an extensive ITV network that supports classroom learning in several locations within Yuma County. The recent successes of WAC Title V grant awards and the wireless broadband access delivered by the RUS Community Broadband Access grant for schools and other large users in the Wellton area have accelerated local development of enhanced instructional delivery capability as well as brought the promise of increased course offerings for the county's Hispanic population. WAC/NAU is reported to be upgrading its campus internet connection from multiple T-1s to a DS-3 in the coming year and to be looking at the potential for converting its distance learning sites to wireless DS-3 connections with Telespectra.

In the short term, video technology favors local and regional distance learning development. In the long term, increasing bandwidth will eliminate point-to-point and point-to-multipoint connectivity issues for both net connected school sites and the individual home user. This increased audience should have the effect of increasing product and variety for users, as well as the market for student participants in programs offered by all Yuma County educational institutions.

### **Other Resources:**

Online Learning Update

<http://people.uis.edu/rschr1/onlinelearning/blogger.html>

Eschool News Online <http://www.eschoolnews.com/>

Distance-Educator.Com <http://www.distance-educator.com>

GAZEL (Global Arizona E-Learning) [http://www.gazel.ws/news\\_&\\_events.htm](http://www.gazel.ws/news_&_events.htm)

## Summary

The distance learning business may be on the cusp of rapid development (due to technology improvements and increasing program options). Continuing interest in infrastructure development by the Yuma County Technology Coalition, and active participation in it by educational institutions should help to protect the capabilities, branding, and programmatic potential of local educational programs as capabilities and course offerings mature and increase. This will help to keep educational revenues local, improve the educational status of the regional workforce, and generate more education jobs.

There appears to have been some falling away from past collaboration efforts between the YEC, outlying districts, and AWC/NAU. This falling away, if it is true, dissipates both their aggregate purchasing power and their potential for sharing common connectivity. Perhaps it is time for a fresh collective meeting to discuss conserving their aggregate power and dealing with whatever issues of autonomy, management, and policy have blocked this possibility.

Yuma County educational institutions should look for infrastructure sharing opportunities and process facilitation (such as establishing a single-point-of-contact for dealing with major vendors) wherever possible. Some school districts may have heavy leased circuit expense for their Students FIRST network designs. If so, these districts should look for community level shared infrastructure (such as dedicated fiber or wireless) to reduce these costs and increase capabilities.

## 11.3 TELEMEDICINE

Telemedicine, in abstract, is probably the most commercially viable use of broadband network technology today, particularly within single corporate networks. In practice however, outside large healthcare corporate networks, there are several limitations that continue to hinder its effective use. Trends in the technology are toward lower cost for hardware, software, and connectivity, but file sizes and real-time video (for such applications as sonography and echocardiography) are leading a trend toward greater bandwidth requirements. Low population density in rural areas, in general, delivers a low incidence for specialty applications and broadest use of the most simple diagnostic applications, generic teleradiology, face-to-face videoconferencing, continuing medical education uses, or simple visual applications. Single T-1 connections, still unavailable or unaffordable in many rural communities, are beginning to seem like a small amount of bandwidth.

A number of Arizona's rural hospitals have video conferencing capability, and the majority of those are using H.323 terminal equipment. This means that those sites familiar with some sort of telehealth practice are currently IP-ready, that is, prepared to take advantage of new video/multimedia capabilities of the internet. This is a significant advantage because the trend toward H.323 technology will allow telemedicine consults to scale down to easy and direct PC to

PC desktop conferences, broaden the use of the technology, and encourage technical resource sharing and other potential new business relationships among formerly competitive organizations. The few remaining sites still employing H.320 equipment (an old videoconferencing standard designed for use in a pre-internet environment with dial-up or dedicated circuit technology, such as ISDN) remain at a communications disadvantage. This dedicated technology limits the variety and ease-of-use of connectivity options available to these sites. But a greater limitation, in the near term, is that the smaller, more remote health clinics without videoconferencing capability cannot be connected to any other location at all. And hospitals with dedicated circuits must use their bridges to get to the other hospitals with videoconferencing capability. This may require a connection across several networks, involving several network administrators, not an insignificant investment in time and personnel costs.

There is also an economic reality working against telemedicine in that health care providers are often competitive businesses and their support and referral relationships to and from rural areas are meant to be fixed (and so protected from competition) business relationships. A network environment that allowed any site to interact with any other site would undermine this business relationship. So any incompatibility or barriers to ease communication outside a fixed relationship are positive values for the primary healthcare business and serve as "handcuffs" to the smaller referral partner.

The good news is that the University of Arizona Health Sciences Center maintains a robust network of 160 remote sites across the state, the largest numbers of which are H.323 equipped. This telehealth networking is still done largely via dedicated T-1 connections where available. The most common application employed on this network is teleradiology, using store and forward technology as opposed to real time consult. A few sites, like the Yuma Regional Medical Center, are using real time telecardiology, which demands significant bandwidth availability.

The future of telemedicine (perhaps as soon as 2010) is for internet-based open network environments, increased reimbursement, and broader access to network-supported diagnostic technologies in primary care, rural, and first provider environments.

Efforts are under way to expand the use and reimbursement of telemedicine nationwide. The American Telemedicine Association and other industry groups are actively lobbying for adding nursing homes, for example, to the list of service types that are reimbursable under Medicare telemedicine regulations. In the current Congress, HB 1940, introduced by Rep. Doug Ose (R-CA), provides funding for rural telemedicine programs at a level of \$40 million a year, in grants, through 2008. The bill also expands Medicaid reimbursements for telemedicine services to include inpatient services. This legislation would also allocate funds to develop and expand telemedicine systems to help improve preventive and diagnostic care access in the nation's rural areas. HB 1940 as well, expands technology beyond demonstration projects and eases licensing barriers for physicians practicing in multiple states.

The Health Resources and Services Administration of the U.S. Health and Human Services Department have also announced the availability of funding for Regional Telehealth Resource Centers. Estimated amount of the competition is \$500,000 with 2 awards anticipated. Funding will be awarded on the following factors:

- If there is a record of success in providing telehealth services to medically underserved populations
- If there is a record for collaborating and sharing expertise with providers of telehealth services at the national, regional, state, and local levels

- If a broad range of telehealth services are offered such as a variety of clinical services, patient, family, health professional education
- Rural residency support programs
- Informatics

There are also a number of other telemedicine program opportunities in the US Department of Agriculture through its Rural Utility Service Distance Learning and Telemedicine grants program. In 2003, USDA awarded \$32 million in grants to 42 states.

***Text of HR 1940 Telemedicine Bill (108<sup>th</sup> Congress)***

<http://www.house.gov/ose/PDF/Telemedicine.pdf>

***American Telemedicine Association News page***

<http://www.americantelemed.org/news/newres.htm>

***Association of Telehealth Service Providers website***

<http://www.atsp.org/>

***Health Resources and Services Administration website***

<http://www.hrsa.gov/>

***USDA Rural Utilities Service website***

<http://www.usda.gov/rus/telecom/index.htm>

***Arizona Telemedicine Program website***

<http://www.telemedicine.arizona.edu>

## 11.4 ECONOMIC DEVELOPMENT POTENTIAL

With greater high-speed telecommunications available, the last component needed to enable aggressive economic development for Yuma County will be in place. The County will be able to offer to new businesses:

- ✓ Advanced telecommunications infrastructure
- ✓ Access to a major highway and transportation corridors
- ✓ Access to an international airport within a 45 minute drive from most population centers
- ✓ An operational, and soon to be expanded, international Port-of-Entry
- ✓ Readily available workforce
- ✓ Wages much lower than in large metropolitan areas like NYC, Chicago and LA
- ✓ Good quality-of-life

The time period during which potentially new telecommunications infrastructure is put in place or the existing infrastructure is expanded is a great opportunity for key leaders to diversify the County's economic base by "selling" the positive attributes the County can offer, including advanced telecommunications, to companies wishing to move to the region.

For example, if a community is interested in attracting additional call centers, there are trade shows where people who own call centers and localities who wish to have call centers can meet. The County, municipalities, Economic Development Corporation and Chamber of

Commerce can offer an incentive package that might include low interest loans, possible financing, an easy governmental process, advanced communications and an excellent quality of life. Another "clean industry" might be software developers since all they need is high-speed telecommunications.

The dominant agriculture industry is already a fairly sophisticated consumer of technology, but that will continue to grow with time and as new applications are developed. This presents an untapped market for ancillary services, like GIS and geospatial data providers, to prosper and offer expanded services to other industries in the Yuma County area. The potential for value-added services in the agriculture sector is significant for Yuma County. Access to broadband infrastructure and technology is critical.

### 11.5 E-BUSINESS

Telecommunications capability is a key requirement of any relocating business, but although large business relocation, call centers, and other job creation concepts are among the goals of rural telecommunications infrastructure development, e-business can be conducted by users with only the most basic of network connections.

E-businesses without real world storefronts or what are called "bricks and mortar" sites are common. There are a number of businesses hosting services available via the internet. For example, a person could start a specialty used or collectable bookstore around an inventory of books stored in their house or garage arranges to have the books listed in an online database at ABEBOOKS.COM (one of many online used book selling services) and fill orders via e-mail and postal or UPS delivery.

These online "storefront" services provide listing, "shopping cart," and secure payment capabilities for a number of specialty markets, including agriculture (see [haysellers.com](http://haysellers.com)), and perhaps most commonly for real estate. Few require more than dial-up network connectivity and a digital camera (plus host fees) to get started.

The most popular online marketplace is Ebay.com, which offers specialty subcategories (approximately 8000 items in **Agriculture**; popular place to find an old tractor) and training for new users who want to become sellers. Many antiques dealers now get a significant portion of their sales from online auction houses such as Ebay. Ebay even offers online and in-person training courses (and there are several books) on how to start your own online business using their service (see <http://pages.ebay.com/university/>).

So e-business in rural areas does not have to be a call center or other large business relocation with significant government investment and costly incentives, it can be a couple of hundred small businesses springing up in rural homes. Just as in business in general, the ratio of small business startups to large businesses is significantly higher, as is the failure rate, but small business creation is much more accessible now via internet services. Rural governments need to promote these kinds of activities to attract revenue and to demonstrate the role that the internet can play in their local economies.

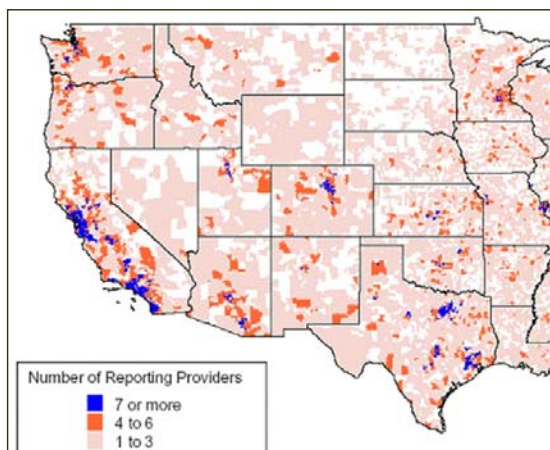


## 11.6 TELECOMMUNICATIONS AND AGRIBUSINESS

Agribusiness in Yuma County is conducted largely on an industrial scale and thus many uses of network technology are embedded in its advanced industrial processes. A Case tractor sales representative in Yuma County, for example, described an OnStar-like remote communication and maintenance assessment program that is an option for their tractors. It uses cellular telephony and the internet to allow farm managers to remotely monitor location, service intervals, and mechanical condition of their tractors. Other advanced processes include remote sensing for environmental and mechanical management, sophisticated uses of radio frequency identification and tracking for both livestock and equipment, and GIS/Satellite mapping for precision farming operations and surveillance of weather, vegetation and moisture conditions.

All agribusiness is not industrial scale, however. Just like any other business, agribusinesses of all sizes need to continually stay competitive, both in this country and in a global marketplace. Most non-agribusinesses have long ago “computerized” and are spending more and more time online operating their businesses and marketing their products and services. This need for increased reliance on telecommunications services has been met in metropolitan areas with the installation of thousands miles of fiber optic cable.

Because farming is not conducted in urban, high-population density areas, agriculture continues to suffer from relative underdevelopment and the popularity of alternative connectivity options for rural agriculture such as wireless and satellite have proliferated. Although there is no shortage of agribusiness applications that require broadband connectivity, the rural areas in the United States are generally not “connected,” and certainly are less connected, in terms of broadband access, than urban centers. The map below provided by the Federal Communications Commission shows Zip Codes that have broadband access providers, (The FCC defines broadband as transmission rates of 200 Kbps or above). The “pink” areas have from 1-3 providers. The white areas have no broadband access providers. We do know that where broadband access is available, rural users and especially farmers/ranchers will take advantage of these services.



Internet use by U.S. farmers has grown rapidly, as advances in technology make the internet more accessible. Use of computers on farms has grown from 38 percent of all farms to 55 percent since 1997, while internet use has grown from 13 percent of all farms to 43 percent. In



2000, 24 percent of farms used the internet as a management tool in their farming operations, including \$665 million in online buying and selling.<sup>26</sup>

As part of the food supply chain, agribusinesses need to more efficiently respond to customer needs and produce food products more efficiently. This is true for any enterprise that is part of a “supply chain.” Internet connectivity offers low cost instant communications with many more parts of the supply chain channel. As with many industries, the internet brings suppliers closer to end-users. Recently, there has been a decline in the number of wholesale distribution channels in the fresh fruits and vegetable sector of the agribusiness industry directly attributed to the use of the internet.<sup>27</sup>

Access to real-time data and extensive research information can prevent or reduce costly problems and reduce risks to agribusinesses. The value of just a few of these applications can exceed the cost of many advanced telecommunications services.

Some of these valuable applications are below:

<b>Problem</b>	<b>How Advanced Telecommunications Access Will Help</b>
Weather, insects, disease unpredictable	More real-time information could mitigate effects resolve problems faster
As products become ready for market knowledge of changing market prices is important	Keeping producers informed as to the value of their products helps producers better judge market cycles
Producers depend on external market variables for values	Real-time price movement helps producers keep pace with changes
Producers market is more global	Advanced communications keeps producers positioned globally
Agricultural equipment has been hard to liquidate and continues to be expensive	Online auctions may make equipment more liquid and lower overall prices
Government policies and changes	Direct connections to State and Federal Government web sites to stay informed
Agribusiness chemical use and environmental impact	An important topic that needs to be reviewed in real-time
Cooperative Agribusiness approaches	When dealing with a regional issue such as disease or pests, community-based information sources may be critical
Agribusinesses always looking to lower costs	Online purchasing of fertilizer or other items required for the business
Problems with crops, soils, weather	Access to university and government reports could help solve problems

High-speed internet access can also play a major role in “precision farming.” Precision farming uses many data points to help determine how to make each field more productive. Moisture content, soil types, weather conditions and many other variables can be modeled to determine how each field can be matched and managed to deliver the best result for each type of crop. For example, a software program called *Power Agronomy* tracks farms, fields, chemicals, crops,

<sup>26</sup> Economic Research Service, U. S. Department of Agriculture, November 2001.

<sup>27</sup> **Agribusiness and Hypercommunications Needs**, By Dr. Dean G. Fairchild

weeds, diseases and insects by inputting daily field visits into the program. Results showing the status of the fields and suggestions to deal with problems are available with the click of a button. [http://software.powertekgroup.com/power\\_agronomy/default.html](http://software.powertekgroup.com/power_agronomy/default.html)

Agribusiness is an integral component of Yuma County's economy. The advantages to farmers and ranchers gained through use of the internet are important; in fact, the advantages to smaller farmers and ranchers are more valuable than to larger agribusinesses. Therefore, the availability of advanced telecommunications services is critical to support this key segment of this economy and keep it competitive. Agribusiness in Wellton got access to broadband internet connectivity from Telespectra wireless only recently, due to Yuma County's success in receiving a grant from the RUS Community Broadband Connectivity program. This success needs to be followed up by a broader facilitation of similar wireless connectivity options for agricultural businesses in all areas of Yuma County.

## 12.0 TECHNOLOGY PLAN

Unfortunately, a development plan for wide-area telecommunications technology does not start with a clean sheet of paper. Instead, the plan must begin with an overview of the myriad of commitments by potential participants, the technological heterogeneity of systems in place, the complex of vendor relationships, the variety of missions and agendas to be encompassed, and important security issues. This report and plan is only the beginning of such an overview. The Governance Section of this report provides some suggestions for how this ongoing responsibility might be addressed by continuing efforts of the Yuma Technology Consortium or any new partnership, which may emerge to take on this task.

### 12.1 CONCEPTUAL DESIGN OF NETWORK

#### 12.1.1 Coherence – Convergence

The most important task in developing a technical plan is for each participating organization to examine the current shortcomings of its own collection of telecommunications services that may have been purchased piecemeal and assembled over time, into a semblance of order. If it is possible, the organization must begin to find commonality with other stakeholders in its area and try to determine how, in both the near and the long term, it can continue to improve the coherence of its purchasing and operating processes for telecommunications technology.

The model of coherence sought is similar to the anticipated "convergence" of communications technologies which is driving both the IT and telecom industries. For example, in many organizations, the IT, business, and telecom functions were once discrete entities whose domains had little or no functional overlap. Today, in e-Government for example, these functions must be integrated and must together approach new issues, such as online security, that did not exist a decade ago. In five years, the public telecommunications infrastructure used by all stakeholders may have converged in a similar way, with structural implications for organizational autonomy and decision-making processes. The current technology "driver" that is providing pressure towards convergence is "Voice over IP," commonly referred to by its acronym, VoIP. Some organizations adopting VoIP have had to make organizational changes due to previous separation of management and staffing for telephony and information technology.

#### 12.1.2 Goal: Alignment

Any organizational or group plan must also have a 2-5 year goal of aligning itself (to whatever degree possible) with statewide, regional, county-wide and local initiatives. The payoff for this effort will be lower purchasing/ownership costs, more rapid introduction of new applications, better return on investment, and the elimination or reduction of external barriers to development. Examples of alignment opportunities in Yuma County would include:

- Wireless infrastructure extension in the Wellton area (a result of a \$1.3 million RUS Community Connect Broadband Grant award),
- Yuma municipal fiber infrastructure development, and

- Infrastructure development in the San Luis area due to upcoming construction of the new San Luis East Port of Entry facility.

### **12.1.3 Discovering Value**

An aggregated approach to infrastructure development can also help all participants discover value in potential partnerships for resource sharing. One participant may have an over-capacity that can be shared, and another may, by sharing that capacity, provide a cost savings for both. Western Arizona College/NAU currently has distance education sites located on K-12 campuses and other shared facilities. Bandwidth could be shared as readily as physical space to the benefit of both parties in a functionally aggregated purchasing arrangement.

Another example: the City of Yuma has plans to implement a fiber optic infrastructure to manage an Intelligent Traffic System (ITS) through out the City. This new network can be expanded with partnerships with the school system and the County to share bandwidth from a single aggregation point. Besides the greater bandwidth, additional fibers could be allocated, at a fraction of the cost, for lease to new corporations planning to locate in the greater Yuma area. This cost savings is possible because the cost of construction of a fiber network is generally 80% to 85% of the cost of the entire project.

### **12.1.4 Renewed Vendor Relationships**

At the same time, a technology plan does not mean that old vendor relationships need to be abandoned. In fact, in the short term, becoming a better customer (by better aggregating an organization's telecommunication purchases) and simplifying business processes with existing vendors may be the surest way to increase the value of an organization's investment in telecommunications technology. This is also an opportunity to resolve technical, service, or billing issues with a vendor, while informing them of unmet needs or added value that the organization may be seeking in the organization's next cycle of development. An informed vendor can provide the valuable input about their intentions that is necessary for any technology planning process.

### **12.1.5 Levels of Effort**

Technology planning for telecommunications infrastructure development in Yuma County should encompass six levels of effort:

1. Wide area public infrastructure development - new construction, either by an aggregate public entity or by existing vendors, in response to the plan requirements of an aggregate entity.
2. Smaller scale (but more than a single city) point-to-point public infrastructure connections/sharing between members of the CTA aggregate group (city to city, educational WAN to local government WAN; and by adjacency, such as an aerial fiber link between the Public Library and the YEC);
3. Community-wide (single city) multi-user (education/healthcare/government) WAN development (GigE with shared internet access);

4. Community level non-vendor point-to-point connectivity;
5. Participant level LAN/WAN development;
6. Discovering business/legal processes (such as a common IGA for telecom resource sharing) that will facilitate the benefits of aggregation.

Methodologies of funding or shared business processes are a critical issue that can best be addressed by subcommittee or task force assignments within the ongoing process of Coalition governance. This may include taking advantage of the processes proposed in the Arizona Broadband Development Authority legislation recently proposed (at GITA).

## 12.2 YUMA COUNTY – GENERAL RECOMMENDATIONS

Shared purchase of network access and the distribution of this access to consortia participants is the method most commonly used to provide more value (*i.e.*, higher bandwidth for the dollar) for network connectivity users. It typically involves identifying the central agent for purchase of the service (and may require letters of agency from participants) and a contract for participation that is often characterized as an intergovernmental agreement or IGA.

Inter-governmental Agency Agreements or IGA's are becoming more common in rural communities across the US. Typically, this involves an umbrella organization, such as a cooperative or local government entity that acts as the single point of contact and purchasing agent for a group of users that share an infrastructure or common geographic area. In an effort to buy in volume to reduce cost of telecommunication services, in many cases at lower cost than existing state contracts, several communities in Colorado and Arizona have entered into such combined purchasing agreements.

A low risk approach to start this process would be to release a joint RFP for cellular and pager services across all communities in Yuma County.

A recently developed IGA plan in northwest Colorado is recognized as a major success. The key to success is the open dialogue and willingness to plan together. IGA's can be as simple as the one created for a the city-wide fiber optic loop project in Ft. Morgan, CO, which shares the cost of DS-3 internet connection across all eligible "beanpole" (Colorado Department of Local Affairs) grant fund entities connected to it.

In the Ft. Morgan project, the County was awarded \$285,000 in grant funds to assist eligible entities in connecting the final mile to the Colorado Multi-Use Network (MNT). The City of Ft. Morgan built a citywide fiber network that the City will manage and maintain, and handle billing for network participants. The cost of the DS-3 and hardware maintenance will be divided and distributed to each entity. This has enabled the entities to operate on a gigabit fiber network and have 10 MB of internet access at less than one-third the cost of a T-1 to each participant.

An example of a statewide IGA process would be the Colorado **Front Range GigaPop** (FRGP) <http://www.frgp.net> operated by [National Center for Atmospheric Research](#) NCAR. This internet access co-op allows all state agencies as well as public agencies connected to the Colorado MNT to participate in a volume purchase agreement through contractual agreements that are effectively IGA's.

Closer to home, the SACCNet Project (Appendix E) has made extensive use of IGA's in facilitating its regional high-bandwidth network in southeast Arizona, including innovative shared service arrangements with several state agencies to meet their increased bandwidth needs throughout the region.

Consideration of a wide-area purchase aggregation or more extensive uses of IGA arrangements is just that: consideration. There is no commitment required unless such arrangements can be proven to be cost effective and practical. However, a number of short term benefits may be possible:

- Starting the IGA process could lead to other volume purchase agreements, which would foster development in many, if not all communities.
- Investigating adoption of existing IGA process /resource sharing agreements that SACCNet is using with the state and local governments (use a common form or template whenever possible to reduce administrative overhead), saving document development time and cost, as well as tapping into existing state agency agreements whenever possible.
- Larger volume purchases will have a direct relationship to lower costs and may also add value (including simplifying service relationships and business processes) whether or not costs are reduced.
- With a larger customer base, the potential service provider might be influenced to deepen its coverage area and provide additional services such as wireless data and free phone to phone calling.

**Risks:**

- Very low risk of transition to new provider.
- Long-term cellular contract may be in place in many communities.
- Coverage areas may not extend to the very remote communities.

### 12.3 GENERAL RECOMMENDATIONS FOR CITIES

All Qwest-served cities and towns in Yuma County not already receiving DSL service should consider petitioning for it. Qwest has been very progressive in 2003 in announcing DSL availability in many smaller communities around Arizona. The technology for extension of DSL service has become more affordable and has made serving smaller communities more attractive from the standpoint of return on investment. Petitioning is a documentary form of community aggregation that says "It's not just a good idea. There are customers here." Qwest has recently shown increasing interest and responsiveness to grassroots forms of market development. In February, Qwest's Arizona President Pat Quinn visited Yuma County and is quoted in a Yuma Sun article as saying the following about Qwest DSL service in the county:

"There are some distance limitations, but for the most part, we can serve you," Quinn said. "People about four miles outside the city of Yuma are still too far out and we are still working toward getting it set up in Wellton and San Luis."

[\[http://yumasun.com/artman/publish/articles/story\\_9767.shtml\]](http://yumasun.com/artman/publish/articles/story_9767.shtml)

Municipalities and the county government should develop a common practice of communicating with developers early in their planning processes to inform them of how they can add information infrastructure to their plans. Telecommunications infrastructure needs to become as much of a necessity for new commercial and residential development as sewer connections, power, and roads. The municipality may consider offering incentives to developers that provide telecommunication infrastructure that aligns with community uses (DSL instead of satellite, for example) and helps build the local broadband market, benefiting the community as a whole by making them a better market for a vendor.

Cities must pay attention to where their infrastructure development orientation originates. This can be done by paying attention to how vendors route existing traffic and how infrastructure development is taking place in immediately adjacent portions of bordering counties and the State of California. Yuma County needs to track issues such as wireless "fog" and conflict issues along the border with Mexico and with radio frequency limitations imposed by the uses within the extensive Federal military installations in the County. If major players such as the higher education campus, K-12 schools, and governments all have different providers and routing patterns that are not locally switched (typically, everyone), this can have major implications for future development of latency-sensitive applications such as IP video among and between sites within the county. For example, San Luis has unique border issues with the limitations posed by less well regulated Mexican wireless services, and the Yuma area has a different set of wireless conflict issues with its extensive military presence.

Municipalities in areas of the county which appear to be either "written off" or of very low development priority to their dominant provider (*i.e.* the Dateland area, served by a very small TDS subsidiary) should work with the Partnership by drafting targeted RFI's soliciting infrastructure development proposals from competing vendors, perhaps encouraging Telespectra to extend its wireless presence, or looking to Trillion for a school-based community broadband effort.

## 12.4 YUMA COUNTY GOVERNMENT / GREATER YUMA

The challenge for Yuma County infrastructure development is unique in Arizona due to the complexity of issues that confront it both geographically and technically. While the population concentration is fairly compact in the western third of the county, a number of other issues muddle the execution of development. Border development and security issues ("Homeland Defense" and INS included) and the massive federal military reservations that overlay much of the county, combined with the isolation of the county and its close proximity with densely populated areas of both Mexico and California, make for a confusing welter of agendas for service for which vendors may be excused for uneven responsiveness.

Within this set of limitations, the Yuma County Government information technology infrastructure is well designed and technologically advanced compared to most rural communities in Arizona. From a technology perspective, the infrastructure is migrating towards



a fully integrated voice and data IP network within the Yuma area, with plans to expand to the outlying county offices over the next 3-5 years.

The recommendations for Yuma County Government will focus on cost saving opportunities, aggregation possibilities with surrounding communities, local fiber builds and strategies to increase private sector demand.

While the City of Yuma also has an advanced design technology infrastructure with plans to continue to add enhancements, the smaller, more geographically distant communities continue to struggle with both the infrastructure and the applications attendant to broadband access. Therefore, our first recommendation would be consideration of the establishment of intergovernmental agreements between the smaller communities of San Luis, Somerton and Wellton, with Yuma County to provide IT technical assistance for both infrastructure development and applications development. This has already occurred with the County and Town of Wellton in the USDA Rural Utilities Service broadband wireless access grant that Yuma County IT department was successful in obtaining on behalf of Wellton.

The opportunity exists to coordinate purchases and deployment of hardware and software that would be interoperable and would streamline technical assistance needs, as well as reducing total cost of ownership through shared support. Because the smaller communities often lack the financial horsepower to hire such expertise in house, a consulting agreement with the Yuma County IT department could facilitate meeting those needs, while helping to provide for a coordinated service delivery system for citizens by multiple levels of government. For instance, the State of Arizona already has a very user-friendly web portal that provides access to multiple levels of information and government agencies. A similar system could be adopted in Yuma County to provide a one-stop shopping experience for regulations, tax information, general information and even economic development opportunities. The latter issue would invite the GYEDC, local EDCs and Chambers of Commerce into the effort.

There was evidence of technological sophistication of some aspects of the business community in Yuma County, particularly in the agriculture sector, but there was an equally significant lack of use and demand by the larger number of businesses in Yuma County, even ones that could benefit substantially from using broadband technology. In order to ensure the growth of demand that would attract substantial infrastructure investment by private sector providers, it will be important to keep the business community engaged and active. We would recommend that the Yuma County Technology Consortium consider establishing an initiative to provide periodic learning opportunities for locally-based business owners to understand the positive economic benefits to be derived from embracing technology. Such an effort would generate a supply of broadband consumers that would help make the business case for advanced infrastructure deployment. It would also fulfill the stated purpose of "Knowledge Transfer", listed as pillar number four in YTC efforts to promote economic development.

#### **12.4.1 Qwest**

Qwest has been aggressively re-engineering their approach towards business in general. Qwest has filed and been approved to serve Arizona with Intra-State long distance which will open the door for LATA boundary adjustments in the near future. We highly recommend a formal business meeting for the Yuma Technology Consortium with Qwest and their sales engineering staff to see what can be done to better serve the county, reduce costs, prepare for the

deployment of advanced services such as VoIP, as well as other applications on the horizon. The Consortium should ask where the county as a whole could expect to see value-added infrastructure development by Qwest, if it would work to aggregate their telecom investments and perhaps simplify the business processes on both sides (thereby reducing both marketing and operating costs). Many organizations interviewed in the survey process of this CTA expressed an interest in moving beyond T-1 or multiple T-1 connectivity to DS-3 or DS-3 equivalent broadband wireless. Qwest should be pressed for a strategy to expand DS-3 level access for public and other users throughout its service area in the county. If not satisfied with the results or the Qwest offer, then we recommend a RFP be developed to shop the market place for these services, as well as potential new services such as ATM, to support your strategic plan. Goals and activities should include:

- Developing a working relationship with Qwest directly, at a higher planning/policy/government relations level.
- Reducing the cost or increasing the service at the same cost will benefit the county.
- If the RFP path is chosen, this will open the door to possibilities that may have individual benefits in some locations and may drive Qwest to the next level or cause Qwest to "fill in the blanks" of its infrastructure.
- Have Qwest identify the development path for its Yuma County clients to next generation broadband services.
- If the RFP path is chosen and a new service provider is awarded a contract, there are many risks involved in transitioning from one provider to another. Planning the network conversion in detail is imperative.
- Voice services should be included in all transactions.

#### **12.4.2 Southern Arizona Communication Consortium Network (SACCNet)**

The SACCNet project in southeastern Arizona provides an interesting case study for wide-area, mixed technology public infrastructure network in Arizona. It is not flawless. It had to develop over a period of time and encompasses many components that are more expedient than favored technology (wireless in some terrains, and a variety of fiber implementations). Nevertheless, it should be examined to identify best practices which could be incorporated in a countywide infrastructure strategy for Yuma County. For more information on SACCNet see Appendix E.

#### **12.4.3 Fiber Networks**

Yuma County and the City of Yuma have several fiber optic networks/cables installed servicing local facilities. There is potential to connect many facilities with local fiber optic connections that would benefit both the city and the county by eliminating wireless systems and any Qwest provided circuits. We recommend that a tactical plan be developed with pricing to construct as many fiber optic connections as possible over the next 10 years, shared as broadly as possible

between the City, the County, educational institutions, and any other Consortium participants that can reasonably participate.

- The city and county should develop a plan that will place fiber optic duct in any open trench during construction or repair of water systems, gas systems and sewer systems. Flexible duct such as 1.25" SDR11 at a cost of \$0.28 per foot can be purchased in 10,000-foot reels or less in telecom color code, and stored in the water department's yard. With the cost of fiber optic cable at an all time low, it would benefit the City and the County to pre-purchase fiber optic cable from companies that over purchased during the telecom boom.
- Ordinances should be passed that permit or require the installation of underground facilities for any vendor if an underground installation or repair is planned. For example, the City of Steamboat Springs, Colorado, has an ordinance in place requiring all utilities to be underground over time. If the power company needs to replace or upgrade the service, they must place the new service underground and all other service providers can install their service in the same trench.

All new construction should have a master plan to follow to eliminate multiple trenches and provide for multiple services.

#### 12.4.4 City of Yuma

The City of Yuma government information technology infrastructure is well designed and technologically advanced compared to most rural communities that we have worked with. From a technology perspective the infrastructure is migrating towards a fully integrated voice and data IP network with an emphasis on wireless and redundancy.

The City of Yuma is in a unique position due to the growth in residential and commercial markets. The City has cable modem service from Adelphia and has had DSL available from Qwest as well as other DSL, internet and wireless ISP's providing high-speed internet access.

The city has been implementing new LAN and VoIP services over the past two years and is currently using wireless and T-1's for point-to-point access and internet service. There is a small fiber network in place utilizing multi-mode fiber.

We recommend that the Yuma County and City of Yuma form a Telecommunications Partnership to consider establishing a telecommunications backbone that covers all public offices and schools and, at a minimum, fiber optic duct in future business development areas. There is currently one major option for such a development:

*Expand the City's current ITS project through a city, county and school system partnership. Bringing the school system into the loop may present some attractive grant opportunities (and e-rate subsidy difficulties).*

Such a backbone will be valuable even without a larger regional network to connect to. Participants and areas that cannot be economically served with fiber should be considered for wireless DS-3 connectivity (layer 2) to the nearest fiber access point. However, it is important to

note that a fiber optic link could potentially have a greater economic development impact along its route, and would provide dramatically faster connectivity (gigabit Ethernet) than a DS-3 microwave link.

In addition, the City and County should work closely with vendors to identify commercial and residential sites that have new or state-of-the-art capabilities so that this information can be communicated to the economic development community and shared broadly, along with municipal plans, among the developer community. For example, if Qwest installs fiber connectivity or redundant service lines (SHARP Service) to a commercial site, it would be to the advantage of both Qwest and the City to share that information with the economic development community and others. Such increased attention to awareness of existing and impending infrastructure development will help improve the coherence of the overall infrastructure in Yuma over a period of years. Ideally, public and commercial telecom development should dovetail into an improved market for all players and users. This cannot happen without communication and a shared planning process.

### Fiber Networks

The City of Yuma has a few fiber optic networks/cables installed servicing local facilities. Other facilities are served by un-licensed wireless systems. There is potential to connect many facilities with local fiber optic connections that would benefit both the city and the county by eliminating the un-licensed wireless systems and any Qwest provided circuits. We recommend that a tactical plan be developed with pricing to construct as many fiber optic connections as possible over the next 10 years.

- Produce a “Strategic Plan” for new residential and business development focused on the telecommunications infrastructure and publish this “Strategic Plan” for all suppliers, vendors and developers to review before going to plan or permit. In addition this plan will be available for potential business to review in planning expansions or relocations of their businesses. The “Strategic Plan” should be a 10 year plan.
- Produce a “Tactical Plan” for the development and deployment of new telecommunication services to the area. Included in the Tactical Plan would be the development of a citywide fiber network connecting government, education, healthcare, libraries and law enforcement agencies. Consider the possibilities of extra fiber optic ducts that would be available to the commercial sector in the plan. Step 1 would map (and share) what is currently known and available and what is planned for implementation in the next 18 months.
- Develop a master plan that would place fiber optic duct in an open trench during construction or repair of water systems, gas systems and sewer systems. Flexible duct such as 1.25” SDR11 at a cost of \$0.28 per foot can be purchased in 10,000-foot reels or less in telecom color code and stored in the water department's yard.
- Pass an ordinance to allow the installation of underground facilities for any vendor if an underground installation or repair is planned. For example in the City of Steamboat Springs Colorado, they have an ordinance in place to have all utilities underground over time. If the power company needs to replace or upgrade the service they must place the new service underground and all other service providers are permitted to install their

service in the same trench.

- All new construction should have a master plan to follow to eliminate multiple trenches and provide for multiple services.
- Work with Qwest to identify the extent of ATM service availability in the county and identify the areas that can be served without additional transport charges... Large businesses as well as many government agencies (homeland defense) are migrating to ATM network infrastructure for its Quality of Service (QOS) advantages.

### **A Yuma County Internet Access GigaPop**

We recommend that the Yuma Technology Consortium, or other new partnership, consider establishing a county internet access aggregation center or “GigaPop” in Yuma. With the possibility of a city-wide fiber network being deployed, and the wireless infrastructure in place, the City of Yuma is in a position to aggregate the county’s public internet traffic. Many school districts and organizations are ready to move beyond single or multiple T-1 connectivity. Public offices, health care sites, and schools and libraries would benefit greatly from the increased bandwidth at a lower aggregate cost. It would be necessary to create an entity that could be above current stakeholders in this service provision and the entity may have to become qualified as an e-rate and RHC internet access provider to preserve federal subsidies for healthcare and school users of its services. This is the only way the smaller aggregate users of internet access could move toward better commodity pricing of network access in the county.

#### **12.4.5 Wellton**

Wellton's history of poor internet connectivity ended recently with the awarding of a Rural Utilities Service (USDA) Community Connect Broadband grant (\$1.3M) that allowed Telespectra to provide wireless broadband in the community and surrounding area. The Consortium should work with Telespectra to find opportunities for its wireless technology to extend high bandwidth services in other areas of Yuma County. See Telespectra's update on the services it has provided in Wellton in Appendix H.

#### **12.4.6 Somerton**

The Somerton School District, Local Government, and the Cocopah Tribe need to sit down and examine their potential for high bandwidth services in the next 5 years. The school district subsidy for circuit costs in e-rate year 2003 was more than \$187,000. That indicates circuit cost commitments that approach capital construction costs for significant infrastructure. The district (or the district in partnership with the city, Cocopah tribe, and other public interests) should consider an RFP for network infrastructure building that could provide more capability for the community as a whole while maintaining e-rate supportability for the district. Wireless vendors such as Telespectra should consider this an opportunity for replacing application limits of T-1 point-to-point infrastructure with better performing DS-3 wireless.

#### **12.4.7 Cocopah Reservation**

The Cocopah Indian Reservation is adjacent to Somerton and shares some services with the City of Somerton, such as fire protection services. It is approximately five miles north of San

Luis and thirteen miles south of Yuma. To maintain its position at the table when infrastructure development takes place in the county, the Cocopah tribe should make common cause with the City of Somerton for immediate enhancement of services from its vendors. At a minimum, the tribe and city should sit down with Qwest representatives to determine the extent of DSL extension that could benefit city residents, businesses, and tribal members, and the tribe should consider placing the telecommunications connectivity status of its casino and other commercial/educational enterprises into the mix of public uses that could potentially be aggregated for mutual advantage in the Somerton area.

#### **12.4.8 The Yuma Educational Consortium (YEC)**

The YEC may be old news in Yuma County, but what it has accomplished in the county is remarkable if compared to what is typically available in other rural counties in Arizona. The YEC may yet serve as a practical model to meet some of the political pressures for administrative consolidation of school districts in the state. Even so, the YEC may need to convene focus groups of county school technology coordinators to determine why it does not have greater participation from outlying and in-town districts. The problem may be one of inadequate marketing communication, lack of participation in governance and decision-making by participants, or the marginal cost savings of participation (which we assume exist) may not be enough to offset the surrender of authority that is necessary in a cooperative purchasing arrangement. The YEC needs to find out how it can become a better and more extensive provider of technology facilitation. It could, for example, negotiate for itself a position of single-point-of-contact for communication with Adelphia for ordering WAN transport and network access. YEC could also provide leadership for the K-12 market segment in any larger aggregation effort which may emerge in Yuma County.

In short, YEC is an excellent resource that could be utilized better.

#### **12.4.9 Western Arizona College / NAU**

The WAC/NAU agenda may be driven by its larger network relationships within NAUNet and the greater Arizona higher education network community. Its reported desire to move up to DS-3 internet connectivity and to move beyond T-1 connectivity for its remote interactive classroom sites mean that it could be a significant participant in a county level internet access aggregation project.

What makes this possibility problematic is that it raises issues of authority. To participate in an aggregation is in some sense to surrender authority to a purchasing intermediary in return for cost advantage or other added value. Organizational purchasing rules or other traditional business practices may make this possibility impossible.

Another consideration is that an aggregating authority would have to either be staffed or contract for technical services from another organization. In Colorado, the Front Range GigaPop, the state's commodity purchasing cooperative for higher education and other public users, contracts for management and business/technical support services from the National Center for Atmospheric Research, a federal organization that is centrally located (in Boulder, Colorado) and has extensive staff experience with very high bandwidth network access.



If a major commodity access Pop was to be created in Yuma County, it might require the resources of the state higher education system, contracted at the WAC/NAU campus, to provide similar management and support services.

#### **12.4.10 San Luis**

The City of San Luis needs to address three telecommunications development opportunities immediately.

The first is the need to upgrade the city's Qwest facilities to a full Central Office, so that San Luis telephone service (including 911) is no longer operated remotely out of the Qwest Somerton Central Office.

Secondly, as part of planning for the new San Luis East Port-of-Entry, steps should be taken to include in the planning, the maximization of the telecommunications infrastructure capability that gets built to serve the new port location. This would include determining the commercial economic development potential of convenient fiber bandwidth access on the path between the city and the new port site. It is cheaper to create multiple, convenient access points in the initial building process than to order and build the modifications later.

Lastly, the city should determine in meetings with Qwest the specific residential and commercial areas that can be remotely provided with DSL service from Somerton this year and next.

#### **12.4.11 Dateland**

Public users in Dateland need to approach wireless providers such as Telespectra and Trillion to see if advanced wireless might, at similar cost, provide better service than the satellite service presently used in the schools, for example. Acting on the behalf of Dateland and unserved areas of eastern Yuma County generally, the Yuma Technology Consortium may want to publish an RFP for improved network access service in the eastern area of the county just to see what may currently be possible with wireless technologies.

### **12.5 CLOSING REMARKS**

#### **12.5.1 Network Security and IP Plan**

In this report we have recommended sharing resources, volume purchase agreements and IGA's. One important issue to resolve early on in any aggregated shared services agreement is an agreed upon Security Policy and IP Addressing Plan. With a shared network supporting internet access to both public sector offices and the possibility of local law enforcement offices, a detailed network security plan will be of utmost importance. Network security design, local switching, and better control of IP addressing can provide better performance by "keeping local traffic local" in the network. With these controls in place early on, the potential partners will be more likely to understand the advantages of participating in the aggregated network scenario.

The IP plan will be just as important as the network security plan. It will be necessary to distribute and manage IP addresses in an organized format. In fact, if law enforcement participates, there will be a need for two layers of security, a closed network for the law enforcement and an open network for all other public entities. This will require at least two IP



address ranges and the ability to manage the plan. Plan to reserve an IP range if there is not an entity with one in hand.

### 12.5.2 Peering

Peering is a critical performance consideration of regional or statewide WANs.

Peering is the arrangement of traffic exchange between internet service providers. *Private peering* is peering between parties that are bypassing part of the public backbone network through which most internet traffic passes. In a regional area, some ISPs exchange *local peering* arrangements instead of, or in addition to, peering with a backbone ISP. This keeps local traffic local, improving the performance of latency-sensitive applications (such as IP video), and reducing the impact of network traffic slowdowns on local network traffic.

In an aggregated environment, some public entities will be contracted for ISP services other than with the potential new aggregator. It may be necessary to investigate or require peering arrangements from providers who provide services to a significant number of local network participants.

### 12.5.3 Engineering

Although the primary concern of infrastructure improvement is access to affordable bandwidth, a close second consideration must be how well a network infrastructure can perform for its users under loads expected from advanced applications such as real-time video conferencing and streaming media. Both routing and security design will be important design considerations for a wide area infrastructure. Participants must be aware of how their IP addressing and their network access provider can affect their performance. If and when ATM becomes broadly used in Yuma County, options for controlling Quality of Service (QOS) will become attractive choices for organizations and commercial users that have performance issues. A group purchase internet access agreement with multiple Tier 1 providers (which the YEC has) will also improve performance stability for WAN users.

### 12.5.4 Redundancy

Redundancy is an engineering issue, but needs to be discussed separately because it is probably the single factor that becomes most critical as users' dependency on high-performance/high bandwidth applications increases. In schools or at health care sites, for example, the ability to provide network-enabled classes and medical care will depend on a reliably performing network connection. For this reason, any preliminary design and any RFP requirement statement must address the issue of redundancy. A common backbone with some sort of "loop" redundancy (capable of redirecting traffic away from a break in the loop), as well as an insistence on connecting to multiple Tier I internet providers, is critical. As a Homeland Defense issue, public health and safety sites, including government disaster direction centers, should have two separate physical links (or one physical and one wireless; to vendors with separate infrastructure, if possible) from each site. As a matter of good practice, all major telecommunications users should ask vendors about the availability of "fail-over" dual-linked systems that can provide a "self-healing" quality assurance to their network connections.

### 12.5.5 Request for Proposals (RFPs)

There are many things the Partnership can do with RFPs and common contracting processes to improve the return on investment for all participants in the process.

First, any RFP should require that all existing contracts with the winning vendor be aligned with the new common contract without penalty costs for early termination and without "installation" or "setup" fees. In effect, the new combined contract would cancel all existing contracts and reconfigure them into a single combined contract for a new term. The new contract term will be negotiable, but typically a vendor will want a five year commitment for any commitment to build new infrastructure. This may be enhanced into a five-year contract with annual renewals for an additional five-year period, which would give the appearance of a ten year contract and some comfort to the vendor. The RFP should also state that a resulting contract could be cancelled or renegotiated upon sale of the original contracting vendor.

The Consortium should communicate draft technology plans to a registered bid list of vendors for comment and input before finalizing their plan and proceeding with an RFP. This can be done in the form of a simple letter-form RFI with an attached copy of a summary of the Partnership plan. Vendors will not reveal pricing strategies or proprietary information in response to an RFI, but they may still be able to offer information about their capabilities and near term development that could affect plan outcomes.

Any RFP should be non-binding on Consortium members, who may choose to participate in a contract that may result. The RFP process itself should also be non-binding on the Consortium, *i.e.*, the RFP does not imply a commitment by the group to any action (only the contract, negotiated point-by-point, can do that).

### 12.5.6 Externalities

"Externalities" are occurrences or other changes in independent variables within the business, political, and other environments that can affect the viability of a project. These can adversely affect the availability and performance of systems that are not within the control of a customer or aggregated group of customers for a telecommunications infrastructure development project or group purchase project.

A common, and often unconsidered problem with service aggregation, is that all participants will typically be encumbered by a mix of service contracts of varying ages that may have as long as 50 or more months to run before they can be shifted without penalty to another provider. Sixty months is an industry standard for preferred price contracts. Many organizations cannot even identify all the contracts they may have underway or know (in some unified sense) all that they may currently be committed to. In a very few instances, an organization may be operating under a matured contract that has been allowed to continue month-to-month and is immediately severable. The result of this 'externality' problem is that bringing willing participants in an aggregated purchasing agreement 'on board' into a single purchasing agreement may take as long as 48 months or more.

"Externalities" also include differences in business or information processes or cultures within potential participant organizations that may impede or prevent operations necessary for a successful aggregation.

A simple example would be the possibility that school or library districts may not be able to participate due to uncertainties or changes in the Federal E-rate subsidy program.

On a larger scale, there are few vendors that have not been stung by the downturn in the telecommunications industry. Therefore, even when an attractive opportunity presents itself, there may be uncontrolled variables which prevent the vendor from taking advantage of it. A very good and very explicit statement of this cloud of externality which surrounds all future planning by all players in the telecom industry is this postscript that Qwest has taken to appending to its public announcements and press releases:

[Qwest] Forward Looking Statement Note *[from a press release dated November 3, 2003: Qwest Offering Voice, Data and Internet Protocol Networking Services to Businesses in 12 Western States for the First Time]*

This release may contain projections and other forward-looking statements that involve risks and uncertainties. These statements may differ materially from actual future events or results. Readers are referred to the documents filed by us with the Securities and Exchange Commission, specifically the most recent reports which identify important risk factors that could cause actual results to differ from those contained in the forward-looking statements, including but not limited to: unanticipated delays in completing the process of our restatement of historical financial statements and related audits; the duration and extent of the current economic downturn in our 14-state local service area, including its effect on our customers and suppliers; access line losses due to increased competition, including from technology substitution of our access lines with wireless and cable alternatives; the effects of our anticipated restatement of historical financial statements including delays in or restrictions on our ability to access the capital markets or other adverse effects to our business and financial position; our substantial indebtedness, and our inability to complete any efforts to de-lever our balance sheet through asset sales or other transactions; any adverse outcome of the SEC's current investigation into our accounting policies, practices and procedures and certain transactions; any adverse outcome of the current investigation by the U.S. Attorney's office in Denver into certain matters relating to us; adverse results of increased review and scrutiny by Congress, regulatory authorities, media and others (including any internal analyses) of financial reporting issues and practices or otherwise; the failure of our chief executive and chief financial officers to provide certain certifications relating to certain public filings; further delays in making required public filings with the SEC; rapid and significant changes in technology and markets; any adverse developments in commercial disputes or legal proceedings, including any adverse outcome of current or future legal proceedings related to matters that are the subject of governmental investigations, and, to the extent not covered by insurance, if any, our inability to satisfy any resulting obligations from funds available to us, if any; our future ability to provide interLATA services within our 14-state local service area using our proprietary telecom network assets (as opposed to on a switched access basis); potential fluctuations in quarterly results; volatility of our stock price; intense competition in the markets in which we compete including the likelihood of certain of our competitors emerging from bankruptcy court protection or otherwise reorganizing their capital structure and competing effectively against us; changes in demand for our products and services;

acceleration of the deployment of advanced new services, such as broadband data, wireless and video services, which could require substantial expenditure of financial and other resources in excess of contemplated levels; higher than anticipated employee levels, capital expenditures and operating expenses; adverse changes in the regulatory or legislative environment affecting our business; and changes in the outcome of future events from the assumed outcome included in our significant accounting policies.

The information contained in this release is a statement of Qwest's present intention, belief or expectation and is based upon, among other things, the existing regulatory environment, industry conditions, market conditions and prices, the economy in general and Qwest's assumptions. Qwest may change its intention, belief or expectation, at any time and without notice, based upon any changes in such factors, in Qwest's assumptions or otherwise. The cautionary statements contained or referred to in this release should be considered in connection with any subsequent written or oral forward-looking statements that Qwest or persons acting on its behalf may issue. This release may include analysts' estimates and other information prepared by third parties for which Qwest assumes no responsibility.

Qwest undertakes no obligation to review or confirm analysts' expectations or estimates or to release publicly any revisions to any forward-looking statements to reflect events or circumstances after the date hereof or to reflect the occurrence of unanticipated events.

By including any information in this release, Qwest does not necessarily acknowledge that disclosure of such information is required by applicable law or that the information is material.

This is rather robust and explicit, but it is a good and detailed statement of why you may not always be able to get what you want or get what you ordered. The best way to derail the negative effect of externality is to involve vendors early in your planning process to help discover unrealistic expectations and inform them of needs which, unmet, may cause the loss of an old client.

### **12.5.7 Caveats**

Telecommunications infrastructure development targets growth and usually follows a bit behind. A handy goal is to try to work to make development take place simultaneous with growth, if not a bit ahead. Areas with no recent growth, no history of growth, and little prospects of growth will always require some outside assistance (a grant, being in the path of a regional effort, etc.) to see development.

What looks like competition is not always competition, particularly if competition involves buying the same basic infrastructure (on better terms) from a competitive reseller. Keep in mind that this may put the user at one more remove from diagnostic and repair services in case of failure.

Educate administrators about the importance of not purchasing solely on cost. Lowering costs may not be worth the risks of either business or technical service problems. There are many good reasons for vendor selection other than cost, of which established and responsive vendor relationships are only one (and RFP processes and government purchasing ordinances should allow for this).

Beware of brand new companies with little track record and those vendors offering assets that are emerging from bankruptcy proceedings. There may have been maintenance or implementation discontinuities, and the "new" company may not be very familiar with what they have to offer.

Avoid fragmenting services. Ideally, the smaller number of vendors contacted for services (and the most simple business process) the better. An exception is the practice of having two or three providers for redundancy and service continuity purposes. An example would be making certain that the network backbone provided connectivity to multiple Tier I internet access providers.

## 12.6 NEXT STEPS

This technology plan suggests a number of possible actions for both the participants and the Yuma Technology Consortium as a whole. The next steps begin with a determination of how the Consortium will proceed. Specifically:

- Which entities will participate in the continuation of the partnership and on what basis (contributing staff resources to the partnership; active in meetings; willing to work in a task-focused subgroup; interested; group purchase participant, etc.)?
- What legal form may the Consortium or its aggregate members take?
- Will member policies permit participation, aggregation of resources, and group purchasing?
- What will be the priorities and "to do" list of the Consortium in the near and longer term?

The initial task of a continuing Consortium may well be answering the question "Where do these findings 'fit in' with the Consortium's traditional focus on information sharing?" One way to approach continuity would be to plan for a countywide conference on the topic of next directions for Yuma telecommunications infrastructure, perhaps to be held on the Western Arizona College/NAU campus. Representatives from SACCNet could be asked to do a presentation on "Lessons Learned" and help the Yuma Technology Consortium members identify practices and resources of SACCNet which can be adopted for the infrastructure development needs of Yuma County. Such a conference would also provide a context for attendees to discuss and determine priorities and initial efforts for the Consortium. In any event, identifying the players and their tasks, and making sure that the Consortium does not set out to "re-invent the wheel" in their infrastructure development are the most suitable next steps.

## 12.7 DESCRIPTION OF TECHNOLOGIES

The following is a summary of the leading, proven technologies that might be potentially available to bandwidth users in Yuma County.

### 12.7.1 Wireline (Copper)

Copper wire is the prevailing infrastructure throughout Yuma County with most Qwest central offices served from the three central offices with fiber infrastructure back to the Phoenix Main CO. Wireless technology is becoming a widely used technology as well – the City of Yuma, the County and residents are finding wireless a cost effective solution for their data needs. Many of the older copper circuits will not support DSL technology that can deliver high-speed broadband circuits over conditioned copper wires due to various reasons.

### 12.7.2 XDSL

In this technology, the high-speed signal piggybacks on the copper voice line through modulation methods. DSL broadband speeds vary from 128 Kbps up to 10 Mbps depending on the DSLAM installed, condition of the copper wires, and the distance from the local telephone provider's central office. DSL is only available within about 3 cable miles (average) of a Qwest Central Office that has the DSL equipment.

DSL comes in various "flavors" that are explained in the DSL Glossary in Appendix M. Because of the relatively high costs to upgrade a Central Office and place DSL terminals in the fields, many Incumbent Local Exchange Carriers ("ILECs") do not offer DSL in less dense rural communities; however, the cost of the "remotes" is beginning to become much more cost effective and can be more easily deployed in "new development communities" today. Currently several companies provide DSL-type services in Yuma County. Qwest has been aggressively deploying DSL in several communities with plans to extend their DSL coverage to several more communities in the next 18 months.

### 12.7.3 Cable Modems

Adelphia Communications is the only cable television company offering cable modem service throughout Yuma County. Their fiber/coax backbone runs throughout most of the county and serves all of the communities included in the study except for Wellton.

### 12.7.4 Fiber Optics

The use of fiber optics creates the highest bandwidth capacity infrastructure possible. This is not to characterize one technology as superior to the others, but to point out that fiber optic cable does not have the limiting factors for increasing bandwidth as other types of transmission methods. All of the above transmission technologies have specific bandwidth limitations. Fiber optic cable capacity can grow as the demand for transmission capacity grows just by changing out the optical lasers on each end of the cable.

The bad news regarding fiber technology is its cost to install and provision service. Typical installation costs range from \$15,000 to \$25,000 per mile for aerial installations and \$25,000 to



\$70,000 per mile for underground installations. Underground installations of fiber cable are usually made in a trench 48" deep or in a duct system if installed by directional boring. The good news is that the cost of fiber optic cable and the construction to install the ducting, fiber and/or aerial is at an all time low. A properly written RFP can reap a cost effective solution.

Many rural communities have opted to install their own fiber network to support the educational and governmental needs and wall as additional fibers and additional ducts for the private sector needs for economic growth. Many of the communities have passed ordinances that mandate this installation of fiber optic duct during and infrastructure rebuild or new installations such as sewer repair or water line upgrade.

### 12.7.5 Wireless

Wireless options are a viable alternative to deliver high-speed bandwidth in rural Arizona or any market area without the "density" to economically provide service over wireline or fiber optic facilities. However, terrestrially based wireless systems usually rely on "land line" or microwave connections back to the internet (World Wide Web) portal.



A low cost infrastructure alternative compared to fiber optics, wireless microwave may be the lowest cost method to improve transmission capacity in the "local loops" of the more rural areas of Yuma County. Wireless "transmitters" or access points act as hubs to collect and transmit signals to users. Most all access points employ line-of-sight technology in order to provide service. Today's new wireless systems operate in the ISM (2.4GHz) unlicensed band and the U-NII (5.3/5.8 GHz) band. The FCC has declared that transmissions in these frequency channels do not require licenses. Access points using this technology typically range from \$3,500 to \$5,000 each. Subscriber antennas range from \$250 to \$400. Many access points can provide coverage from 4 to 8 miles and can support 100 to 500 users.

Data bandwidth capacity delivered by these systems can range from 128 Kbps to 10 Mbps. Weather conditions do not interfere with this technology. This new technology can provide very reliable data transmission services and also currently support voice (VoIP) technology. The cost of these wireless systems is perhaps their most compelling attribute. It is important to note that, although wireless technologies can increase local loop bandwidth, aggregate bandwidth capacity in and out of the county or towns may still need to be increased.

The latest innovation in wireless technology is the emergence of Wi-Fi "hot spots." These hot spots beam internet connections up to 300 feet making them perfect for local gathering spots like coffee shops, libraries, RV parks, truck stops, laundries, marinas and airports. For example, Starbucks and McDonalds are actively rolling out Wi-Fi- access in major metropolitan areas. The speed that can be achieved is limited by the type of broadband connection (DSL, cable, fiber) to the internet. The Rocky Mountain News stated that "According to Gartner's research, the number of public Wi-Fi hot spots in North America is expected to hit 53,479 by 2008."<sup>28</sup> The full article can be found in Appendix G.

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<sup>28</sup> "Freedom to Connect," Rocky Mountain News, January 19, 2004.



### 12.7.6 Satellite Technology

Two-way broadband Satellite internet access ("Satellite") offers residential and small office users a high-speed alternative to dial-up in areas where no other alternatives exist. Two-way access is currently provided only by Hughes' Direcway service. EchoStar's Starband product has been discontinued and Echostar (DISH Network) now offers terrestrial internet access through an agreement with Earthlink.



While Satellite is a welcome option for users that require high-speed access but are currently unreachable through terrestrial solutions, either wire-line or wireless, the technology does have a number of drawbacks at this stage. Based on opinion and experience of satellite users, the limitations listed below currently make Satellite the technology of last resort for high-speed internet access.

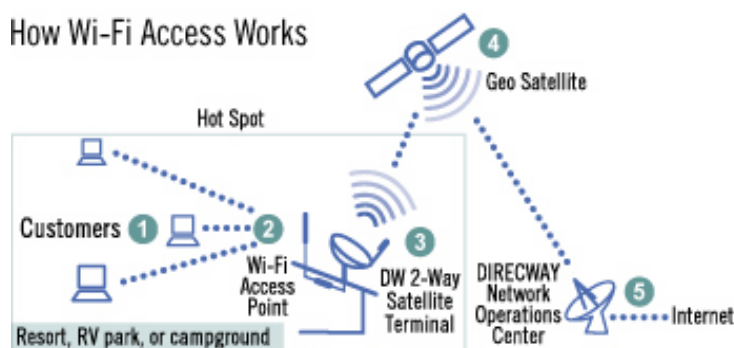
- **Latency.** Perhaps the greatest factor limiting Satellite's adoption and ultimate usefulness is the time it takes an internet transmission to travel between the end user and the requested web site via the orbiting satellite. The ½ second round trip delay (¼ second each way) means that real time interactive applications such as voice over IP (VOIP) and interactive gaming cannot be supported by Satellite. This deficiency in the technology will only grow more noticeable as increasingly sophisticated interactive applications emerge on the internet.
- **High equipment and install costs.** Equipment and installation costs \$599.99 and includes installation plus the external modem, satellite dish antenna, transmitter and mounting hardware. Install times are advertised at roughly four hours although the process can take significantly longer based on the installer's experience and the user's computer setup. Additionally the 24" x 36" Satellite dish can be obtrusive and may not be allowed in certain communities.
- **Higher monthly fees.** Relative to other high-speed technologies Satellite's monthly costs are high with monthly charges of \$59.99 for residential customers. Direcway offers business class services that range from \$76 to \$190 per month based on the bandwidth needed. It should also be noted customers can choose to use their dish for satellite TV as well (requires separate TV receiver) and beginning costs for both services are approximately \$100 per month.
- **Line of sight and snow/rain fade.** For satellite to work, a clear view of the southern sky is necessary. This presents a challenge for users that live in heavily wooded or exceptionally sheltered areas. Additionally heavy snow or rainfall can affect the service with the potential to bring the system to a temporary standstill.

However, even with the many problems and technological limitations facing Satellite internet, the service is a major improvement over dial-up access. Satellite's major selling points are listed below.

- **Versatile deployment.** Satellite's greatest attribute is its ability to be deployed anywhere with a clear view of the southern sky. Satellite can reach users and remote communities that will never be within range of terrestrial solutions based on location or economics.
- **High speed.** Satellite providers advertise residential download speeds of 500 Kbps (10x that of dial-up and competitive with other terrestrial high-speed solutions) and 150 Kbps upload speeds. Tests from several residential systems show these speeds

are consistently met. Direcway's business class services can reach download speeds up to 1000 Kbps.

- **Always on.** Two-way Satellite access is always on. Users can surf the internet anytime without the need to tie up the phone line. (Direcway offers a less costly one-way system that uses a dial-up connection for upstream requests.)
- **Ability to network.** Satellite connections can be shared among computers in both home and office environments. Of course the more computers on the network the more bandwidth required, which leads to increased monthly costs. A residential connection can support three-four computers with reasonable speeds. A residential connection can support three-four computers with reasonable speeds.
- **Wi-Fi access.** Satellite is currently offering their service as the "backbone" for Wi-Fi hot spots across the United States. They are targeting the leisure industry in places such as resorts, RV parks, campgrounds and truck stops.



At the end of the day, satellite is a good, dependable alternative to dial-up access for heavy internet users that are unreachable by other high-speed technologies. However, the cost of equipment and higher monthly fees make it prohibitive for many. The latency issue and the inability for Virtual Private Networks (VPN) to work on Satellite, while not major problems at this stage based on the mild demands of current popular internet applications, will emerge as a major drawback as the internet's evolution continues. Satellite can be seen as a worthy stop gap technology for many users, both home and business, until terrestrial solutions, often faster and cheaper, are available. More information on Satellite services can be found at [www.directpc.com](http://www.directpc.com).<sup>29</sup>

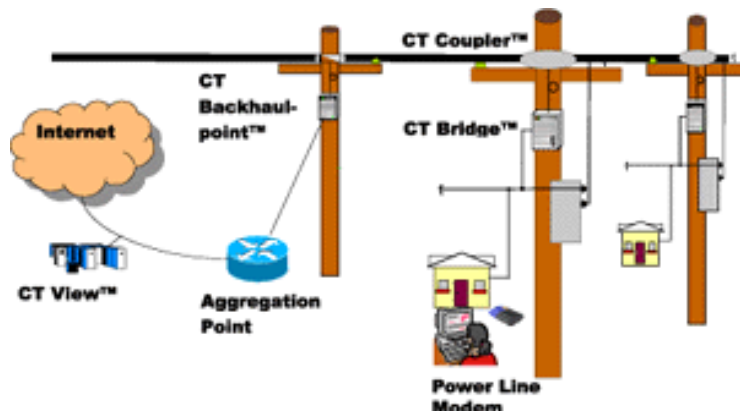
### 12.7.7 Power Line Data Transmission

Power line communications (PLC) is a relatively new entrant to telecommunications. The technology uses existing local electric wires to provide digital communication services such as high-speed internet access, voice over IP (VoIP), video and in-home networking in a cost effective last-mile delivery system. All that is needed is for the device (telephone, PC, multimedia) to be plugged into existing electrical outlets.

PLC has been around for a number of years using low data rates (less than 500 Kbps) for remote control of switches, domestic appliance control system, and monitoring systems. The new PLC differs from the old by offering broadband data speeds in the 4-20 Mbps range. This enhanced power line communications system is "piggybacked" on existing low frequency wiring

<sup>29</sup> Information from Jack Ferguson, President of ISP Reports ([www.ispreports.com](http://www.ispreports.com)) and owner of a two-way satellite system.

(50-60 Hertz at a low frequency). Below is a diagram of such a system provided by Current Technologies™ ([www.currenttechnologies.com](http://www.currenttechnologies.com))



Applications of this technology most frequently cited are for in-house and last mile uses. In-house refers to a data path that is typically less than 100 meters between devices, as in a house or building. This has been seen as an attractive, less costly means of retrofitting data services for homes and small offices because no additional wiring is necessary – all devices (PCs, printers, etc) are simply plugged into the existing electrical system.

Last-mile applications refer to the ability to connect the long haul telecommunications plant of the broadband service supplier to the customer. A significant portion of the cost of building a broadband plant is connecting the “backbone” to the final customer. Cable television plants were built primarily to serve the television needs of their customers. Therefore, the bulk of the plant was built in residential areas, not in the business district. Legacy telephone plants have needed massive upgrades for their devices to be able to handle broadband rates. Wireless (WISP) services mostly require line-of-sight to reach their customers. In addition to broadband internet, this PCS system can also provide VoIP, video, surveillance systems, entertainment (gaming) and utilities metering services.

## Issues

There are a number of issues that have been raised by the introduction of broadband power line communications systems.

- Compatibility between private and public networks
- Telecommunications policy issues
- Radio-communications interference issues
- Signal to Noise Ratio
- Capacity/Security
- Transformers
- Safety and Procedural

The issue that has gained the most notoriety is that of radio-communications interference. This interference is generated by faults in the wired network such as arcing switch gear, coronal discharge and discharges across dirty insulators, particularly in the high frequency spectrum of 3 to 30 MHz. Users that could be affected include amateur radio, aeronautical and maritime communications, navigation services, broadcasting, and fixed and land mobile operation.

Concerns have also been expressed regarding possible interference to cable television services and DSL services.

These issues are being addressed by the industry, by the FCC (PLC is subject to Part 15 emission limits) and by state utilities commissions and is defined as:

*A system, or part of a system, that transmits radio frequency energy by conduction over the electric power lines. A carrier current system can be designed such that the signals are received by conduction directly from connection to the power lines (unintentional radiator) or the signals are received over the air due to radiation of the radio frequency signals from the electric power lines (intentional radiator)<sup>30</sup>.*

There is a group in the US called the “HomePlug” power line alliance made up of seven sponsoring companies (including Cogency, Panasonic, Radio Shack and Sharp) and twenty participating members (including Motorola, Philips Electronics, Sony Corp and France Telecom). This alliance has developed a standard specifically for in-house systems and meets the FCC Part 15 requirements ([www.homeplug.org](http://www.homeplug.org)).

### **U.S. Trials**

There are ten or more pre-market trials currently in process to test the efficacy of PLC and to prove that interference issues have been overcome. The City of Manassas is currently offering PLC to residential and business customers. The current cost for residential services is \$26.95 per month. Business services start at \$59.95 for 256Kbps speed and increase to \$35.97 per month for 1.5 Mbps speed. Southern Company has partnered with Main.net ([www.powerline-plc.com](http://www.powerline-plc.com)), Ambient ([www.ambientcorp.com](http://www.ambientcorp.com)) and PowerComm Systems ([www.powercommsystems.com](http://www.powercommsystems.com)) and has just completed successful PLC trials within their Georgia Power and Alabama Power territories. PPL Telecom is conducting trials in the Leigh Valley area (Allentown/Bethlehem) of Pennsylvania, PEPCO has partnered with Current Technologies to conduct trials in the DC and Maryland area, and Consolidated Edison of New York is conducting trials using Ambient equipment.

### **Conclusions**

Power line Communications is coming. In fact this technology is already being offered in limited areas of Europe (Finland, Iceland, and Russia) and, in addition to the United States, is being tested in Asia and Latin America. The industry is working through technology issues, regulation issues and worldwide compatibility issues. Commercialization of this technology is expected to gain momentum over the next few years.

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<sup>30</sup> *Update on Broadband PowerLine Communications in the Americas*, United Powerline Council, May 29, 2003

## 13.0 SUSTAINABILITY PLAN

### 13.1 SUSTAINABILITY STRATEGIES

The telecommunications activity observed during the survey phase of this study shows that there is an active, developing market for advanced telecommunications services in Yuma County. The market will grow adequately in some areas of this region, even if no attention is paid to development of a countywide initiative for enhanced bandwidth services for public and commercial users. However, this will result in uneven development, potentially "leaving behind" major users, such as some County government locations and smaller, more geographically remote communities if the process is left to market forces. A coordinated, regional focus will sustain advanced development and provide a better environment for economic development and quality of life support for the larger community over the course of the next decade.

Since state funding for implementation projects is not currently available and may not be available through other government funding processes, Yuma County as a whole should use this report to discover and capture existing opportunities with respect to:

1. How telecom expenditures are currently being used by the region's stakeholders;
2. Whether these funds can be spent to receive more value both individually and potentially as a region-wide aggregate.
3. If it would be worthwhile to form a group of stakeholders and publish an RFI/RFP (non-binding) to elicit advantageous service pricing or local infrastructure investment from vendors. At a minimum, the RFP should include the following:
  - Vendor will provide all routers and equipment to connect to network.
  - Vendor presence and job creation in the community.
  - Vendor must offer all services to the community-at-large as well as public offices.
  - County has the capability of accepting portions of responses or rejecting all RFP responses.)
4. If the county could and should form a special district or enterprise fund to capitalize, build and manage an enhanced telecommunications infrastructure?

This strategy is pragmatic and seeks value through aggregation of current spending and increased awareness of community infrastructure and network access options.

## 13.2 SUSTAINABILITY RISK FACTORS

**Risk:****Strategy:**

Lack of technology leadership resulting in limited access to new applications.	<u>Identify and pursue leadership demonstrations</u> True and lasting development will follow the introduction of new applications. The governance group will have to work with participants to identify which of them will pursue grants, and implementation of new technology demonstrations.
Countywide telecommunications planning does not go beyond "paper" stage.	Hold periodic meetings of stakeholders to report options and ongoing developments in the local telecom infrastructure.
Hardware upgrade costs slow adoption of high-bandwidth connectivity.	Pursue grant funding for public users.
Monthly telecom service costs increase	Educate users about historic trends. The trend is for telecom costs to decrease over time. Costs will more likely decrease or more bandwidth will be available at the same cost.
Failure to engage participation by remote sites due to service limitations and high costs.	<u>Activism</u> - Multiple strategies, including public investment in infrastructure outreach, may be required to extend equitable service access to sites such as Tacna, Roll and Gadsden.  <u>Mutual benefit of development</u> - governance group should maintain a continuing and friendly dialog with all vendors, targeted at assisting them in business development and feasibility requirements for service to remote sites.
Some public agencies/non-profits do not have a budget for investment in LANs, new routers, or baseline PCs to be able to connect to an enhanced network.	Upgrades should be addressed in the aggregate in future budget projections, not by individual department or agency. Collectively, all stakeholders should arrange group purchase agreements for standardized equipment.
Agencies included in the RFP might not sign long-term service contracts.	Clear communication of commitments, along with use agreements by all agencies prior to issuance of the RFP will be needed so that RFP bidders can more accurately price their bids. Most agencies to date have indicated a willingness to enter into long-term contracts for improved services.

Economic development risks.	Economic development risks will be very high should the county <b>not</b> improve telecommunications services. We can associate no economic development risks with improving telecommunications services in the county.
Financial risks that there will not be adequate aggregated demand for a provider to either upgrade the existing system or for a new provider to enter the market.	These financial risks to the county will be addressed by making sure the improvements requested will be affordable to the targeted user group. New infrastructure providers will face a greater risk than the incumbent but technology, like wireless networking, may lower capital and operational costs.
Political risks for incumbents.	Spending on telecommunications technology in light of other priorities may be politically risky during the current economy. However, failing to invest in an opportunity to ensure economic growth is also risky.
Operational risks of implementing the network.	Operational risks can be addressed through the RFP process and working with the telecommunications providers serving the region. Operational risks can be reduced by requiring higher service standards and advanced telecommunications services as part of the improvements made to telecommunications infrastructure.

The most significant risk is that a small number of the public stakeholder entities will actually contract for services and thus cause the successful RFP bidder to either raise prices or withdraw from the area. Since the bandwidth requested is minimally more expensive than what is being paid now we do not believe the above scenario will occur.

It is possible that some entities might decide to stay with their existing providers. However, we believe that other public offices and the private sector growth will more than offset those who choose not to buy services, especially when the benefits and applications aggregate access to high-speed bandwidth become commonly known throughout the community.



### 13.3 STRATEGIES FOR SUSTAINABILITY RISK MANAGEMENT

Strategies for making sure the above referenced growth will occur will be in the form of targeted business development activities. Although some residents express concern about rampant, quality-of-life-changing growth, most persons we contacted agreed that the communities and the County will need to attract additional businesses, broaden the tax base and plan for that growth.

Providing shared network connectivity for all the health care offices serving and surrounding the Yuma Regional Medical Center is an example of long term planning for economic development. This would facilitate the development of office- and facility-based telehealth services, increase productivity (if it can reduce the need for patients and physicians to travel across the county, across town, or even, across the street to the Hospital for services or consultations), and improve the business capabilities (such as staff training and online billing) of all hospital-area healthcare providers. Planning and providing for advanced connectivity for the rapidly growing residential areas of Yuma County, areas like the Foothills, San Luis, Somerton and Wellton provides an inducement for the location of technology-driven clean industries as well light manufacturing and agriculture-related support industries.

Finally, a critical long-term sustainability strategy must include exploration of the establishment of a state-wide, coordinated broadband backbone that ensures generalized access to technology without respect to distance, density or terrain factors. While this is a project that logically cannot be done from the regional perspective, Yuma County, along with its neighboring counties and others interested in obtaining low-cost, high speed, reliable broadband service access, have an interest in seeing such a network developed. Access to a state-wide broadband network would provide a more cost-effective network connection for public users who can singly or in some form of consortial arrangement take advantage of participation in a county or regionally-operated infrastructure network, or individually contract for multi-megabit connectivity. Ideally, however, incremental improvements in network connectivity should be done in such a way to benefit both commercial and public users of the enhanced broadband network resource.

## 14.0 GRANTS AND LOANS

### 14.1 Introduction

This section of the CTA report provides suggested strategies for leveraging grant dollars and other funds for telecommunications and telecommunications related projects. It includes information on four different types of grants – federal formula grants and subsidy programs, federal discretionary (competitive) grants, state grants, and private foundation and corporate grants – as well as loans that are available for telecommunications and telecommunications related assistance. It also includes information on other potential financing mechanisms and resources for conducting additional research on State and Federal grant and loan opportunities and private foundation grant-making programs.

**The Current Grant Climate:** The golden days for grant funding of telecommunications infrastructure were the early '90s when the internet was new and its heyday began. Along the way, the concept of a *digital divide* emerged, and this gap between haves and have-nots, rich and poor, urban and rural, continued to fuel grant program availability and program targets. The durable problems of *last mile* connectivity and *backhaul* charges, and the extreme geographies and low population densities of west-of-the-Mississippi states (where there are many counties with less than three persons per square mile) also gained attention and generated funding opportunities. But the dot.com boom went bust, the telecom industry declined, government revenues constricted, and private foundations moved on to other priorities. The bloom is off the internet and all current funding sources now cast a cold and judicious eye on telecom projects, just as private financial sources do. The opportunities are still there, but the pie is smaller, proposals have to be more original, they have to clearly convey the end use and broad community benefits, and they have to have strong business plan-like cases for sustainability. It is no longer enough to request funds for telecommunications development; you now have to be able to demonstrate how you will use the bandwidth to achieve desired community outcomes such as health and well being, public safety, educational excellence, economic development and so on.

**What Funding Sources Are Looking For:** Most sources of funding are competitive, so proposals need some originality of concept, innovative process, or remarkable organizational collaboration to stand out as a viable candidate for funding. Here's what funding sources are looking for recently:

- A definite (and preferably new appropriation) cash match - some grants require a 1:1 match, others only require a 15-20% match, and a few require no match; evaluators of proposals *always* score greater match percentages higher.
- Demonstrated experience and capacity (by the vendor or proposing organization) with previous technology projects;
- In-kind match should be tangible (a donated router, for example);
- A genuine and credible "business" plan for sustainability past the expenditure of sought funds;
- Collaborations and partnerships with the prospect of improved community aggregation and resource sharing as an outcome;
- Vendor participation, preferably as a capital investment to match to community-generated funds;
- Diversity of applications and users with broad community benefits;

- Economic development impact;
- Filling gaps that will not be filled by commercial providers.

**What they are not looking for:** The days of gee-whiz technology demonstrations are over. Industry standard technologies -- advanced, if possible -- are favored, and extreme technologies (such as satellite) are tolerated only as a worst-case resort. An exception to this observation is the continuing interest in innovative applications of wireless technology, particularly in settings which are impossible for conventional infrastructure to address. Grants will not likely fund technology projects that do not clearly convey how the technology will be utilized and how this use will result in positive “big picture” outcomes for the community and region. Also, funding sources are not interested in funding operational expenses -- all investment sought should go to specific project components such as infrastructure and hardware. Note that when a grant request fails, many grantors will share evaluation information with proposal writers so that they can learn what evaluation teams liked and did not like about a specific proposal. Over time, this information can be used to sharpen the writing of grant requests and become successful.

## 14.2 Suggested Grant and Loan Strategy

Telecommunications projects are large, often complex projects which require sophisticated resource development through many mechanisms. This complexity and size dictates a fund development strategy which investigates and utilizes several sources of capital simultaneously. As such, the suggested grant and loan strategy has several components, as outlined below.

### 14.2.1 Seek to develop effective collaborations and partnerships

The outlook for grant funding sufficient to support wide area infrastructure development has never been bright. However, developing strong collaborations and partnerships, especially new “model” collaborations and partnerships, can be an important first step in developing a successful grant campaign. Many of the resources discussed in this document may have already been pursued by constituent organizations in Yuma County. Aggregate proposals by several organizations for mutual benefit are one strategy for wide area infrastructure development. This is something that may appeal to some funders, such as the TOP program of the Federal Department of Commerce and the USDA’s community broadband grant program.

Telephone companies as partners: Although independent telephone companies are often regarded as quaint holdovers from the historic period of rural electrification, they are typically more progressive and entrepreneurial than large vendors and have greater personal investment and institutional history with the community than any other potential provider. Yuma County’s sole small telco, Arizona Telephone in Dateland, however, is a captive asset of TDS and is reportedly unresponsive to any development requests. Yuma County should still periodically seek a response from Arizona Telephone regarding development possibilities, but a more likely partner for working collaboration will be competitive, alternative technology companies such as Telespectra or Trillion. The County or the Yuma Technology Consortium may want to consider pursuing grant and loan development projects with these sources for infrastructure projects that extend their service areas, particularly in eastern and central Yuma County.

Cable companies as partners: Community cable system operators can contribute to community technology infrastructure in several ways. Perhaps the most traditional of these is the access trade-offs many cable systems make as part of the contracting of their franchise agreement,

often including donations of access to local schools and libraries, or providing service to a local government television channel. Unfortunately, most franchise agreements were negotiated well before cable systems became a player in the internet access marketplace, and local government officials are often not aware of network access infrastructure possibilities and do not include future access development considerations when franchise renewals are negotiated. In addition to system access, many cable systems have well-defined community relations programs which typically provide small grants to community organizations, not limited to donations of service or technology-related programs.

Examples of creative partnerships which resulted in funding from the TOP program include "Technology for All," a Houston fiber-optic network project linking local community technology centers which was proposed as a jobs creation program with community economic development benefits. The project established a broadband, fiber optic network between local community technology centers with the objective of creating sustainable employment opportunities for low-income Houston residents. The proposal justified the development of a community fiber optic network that then could have other development or public service uses.

The *Technology For All* (TFA) project was the result of a partnership between the Houston's Mission Milby CTC; two CTCs in The Heights CommuniPOP; the East Side Village Community Learning Center in Houston's Third Ward; Dimension 4, a document conversion company; the Houston Area Technology Advancement Center; the Telecom Opportunity Institute; Houston's STREET U workforce development initiative; the Local Initiatives Support Corporation; Decision Information Resources; and several supportive organizations including the University of Houston College of Technology, LULAC National Educational Service Center, Houston Independent School District and Houston Community College. Community participants include the school district, a university and community college. The project both created an annual estimated payroll of \$1 million with an economic impact of over \$4 million and created income to sustain the project. For more information on this creative partnership and project: <http://ntiaotiant2.ntia.doc.gov/top/awards/details.cfm?oeam=486003012>

Another example of a broad partnership is in Northwest Colorado where three counties, five municipalities, two hospitals, six libraries, and six school districts worked together to leverage Community Development Block Grant funding, as well as grant funding from the State of Colorado, to develop telecommunications capacity in the region. In addition to leveraging \$1.675 million in grant funds (plus substantial additional e-rate funds), the partners aggregated all of their services with one vendor, and in doing so, were able to negotiate a contract which resulted in additional fiber infrastructure, new DSL capacity, and elimination of backhaul charges, all at favorable rates. The vendor was able to take the contract (which served as a guarantee of business and market size) to a utility funding source to secure substantial loan funding at favorable rates. This funding launched the company's infrastructure development and services in the region. The introduction of infrastructure "proved" the market case and competition in each of the previously unserved markets developed with positive outcomes for the region - the partner entities and the general public ended up with better infrastructure, more services, more options, and better pricing. In addition, each partner entity continued to pursue grant funds for their specific needs, such as digital government for municipalities, video arraignment for public safety, or telemedicine for the hospitals.

### **14.2.2 Develop new or increased grant writing activity and grant capacity in the region**

Developing new or increased grant capacity and grant writing activity in the region can take many forms. At its most basic level, this would include each organization supporting the grant seeking efforts by other organizations for projects that will have related benefits for sites in the region. This can include providing letters of support, technical assistance on project development, grant writing assistance, participating in components of the project, or providing in-kind services or cash match (even a token match) to the project.

Another method of increasing regional grant capacity is to consider coordinating grant activities and to aggregate similar grant projects into a larger entity that would pursue the same resources. Most stakeholders are actively pursuing grant support for their technology development. As such, they may resist considering aggregation into a larger entity that would pursue the same resources. The best course of action in the near term would be to convene a meeting of grant-seeking organizations and their skilled grant writers to discuss strategies that would allow some form of two-tiered activity that would support maximum participation in an aggregate grant project, while protecting their own grant seeking behavior from favored sources. Such a meeting would also facilitate the development of shared goals for wide area infrastructure development.

Persisting in grant-seeking over a period of years, meeting with potential funding sources, and developing solid relationships with funders are all important capacity building steps. Finally, leveraging grant dollars successfully requires not only developing a solid project that meets funding criteria, but also researching grant sources and criteria, developing a competitive grant application and proposal, managing the project and grant, and conducting all grant reporting. When several grants are procured for the same project, the complexity increases in terms of financial management of each of the grants. An important component of grant capacity building would include developing and sharing on a regional basis, knowledge, capacity and expertise in each of these areas.

### **14.2.3 Identify discrete smaller projects within the larger vision and project**

A first step for Yuma County in pursuing grant and other funding sources is to identify elements in an infrastructure plan which can be targeted for grant or loan funded investment as a discrete project that is a component of the overall vision. Segmenting the large visionary project into smaller fundable components is a bit like developing a jigsaw puzzle. Each piece needs to be a discrete stand alone piece which can be funded by an appropriate source, while simultaneously feeding into the larger project. There are very few funding sources that will be focused on funding the entire project, however many funding sources could be interested in different smaller aspects of the project. Segmenting a project into smaller components allows the collaboration or a single entity in the collaboration to seek funding for a particular project element from a funding source that is a good fit for that element, but not for the entire project. Once the overall vision and subcomponent projects have been identified, all stakeholders who could benefit from the proposed infrastructure development should collectively pursue multiple funding sources to support the proposed development.

### **14.2.4 Phase Projects**

Most grant and loan funds require a discrete project period, which is typically anywhere from 12 months to 2 years. Dividing a large, multi-year project into smaller phases will not only enable

you to leverage multiple grants from the same funding entity (for phase I, phase II, etc.), but also it will assist in meeting funding period requirements.

#### **14.2.5 Maximize the use of formula grants and subsidies**

The lowest hanging fruit in the grant world are formula grant programs and subsidies. These grant programs are open to any entity who meets the eligibility criteria. There is paperwork associated with getting these funds; however the process is guaranteed and the funds can contribute to the overall project. For example, not every e-rate eligible entity is applying for the e-rate subsidy. Full utilization of e-rate would increase the level of demand for services, making the market more desirable. Provision of these services could be aggregated to support the overall vision. More information on opportunities can be found in the Federal Subsidies section.

First – seek grant funds from funding sources interested in fostering development of broadband communications. There are a few programs which fund telecommunications directly. These programs will be the most direct method of securing funding for different phases of the overall project and should be thoroughly investigated, and contact made with program personnel. Direct funding programs include the USDA community broadband grant program and the Department of Commerce's Technology Opportunities Program. Both of these funding sources are competitive, so having a strong partnership, clear outcomes, and project sustainability is critical. More information on broadband grant programs will be found in the section on Federal Grant and Loan opportunities.

Second - seek grant funds from technology friendly funding sources interested in related goals: There are several funding sources which, while not interested in funding telecommunications for telecommunications sake, will provide funding for telecommunications services and equipment if the overall outcome of the project leads to their desired outcomes. Examples of this are the US Department of Agriculture's Telemedicine program and the Department of Homeland Security's focus on communications. When applying for these grant funds, it is critical that you be clear in how the telecommunications infrastructure will be used once it is funded and developed, and that you sell the end use and outcomes for the particular subject area (telemedicine, health, public safety communications, etc.) while making the case for telecommunications as a necessary step. More information on related grant programs will be found in the section on Federal Grant and Loan opportunities and State Grant Opportunities.

#### **14.2.6 Pursue loans and other financing mechanisms where appropriate**

Not all components of the project will be a good fit for funding by grants or subsidies. Luckily, the federal government has several very helpful loan programs which seek to support infrastructure development projects through loan and loan guarantee programs such as the US Department of Agriculture's Broadband Loan Program through the Rural Utility Service. These, and other federal program loans, are substantially cheaper than commercially available credit. The eligibility issue for these loans is the ability to generate a sufficient revenue stream to repay the loan made to a private business, either not for profit or profit. For a private company to accept debt to improve infrastructure, it is likely local communities would have to shelter some of the risk through a revenue stream guarantee of some form. A consortium of municipalities, county, and school districts might consider sharing the risk among multiple agencies to enhance the overall community. More information on sources of loans can be found in the section on Federal Grant and Loan Opportunities.



In addition to loans, there are many financing options which are available to local governments. There are many State programs and agencies which provide technical assistance and support to local units of government seeking to develop new tax or bond funding for a community infrastructure project. These organizations, such as the Greater Arizona Development Authority, could be significant resources in any effort to develop new tax or bond funding for telecommunications infrastructure. Finally, Arizona State is in the process of developing Venture Capital funding to support entrepreneurial projects and new business development. Should this effort be realized, this could be a potential source of capital for a large project. More information can be found in the section on Other Financing Options.

### 14.3 Federal Formula Grant and Subsidy Programs

#### 14.3.1 Federal E-Rate Subsidy to Schools and Libraries

The most stable ongoing source of telecommunications support funding is the Federal e-rate program, which has provided an average of \$46 million in telecommunications, internet access, and internal connection subsidies to Arizona schools and libraries annually from 1998 to 2002. In Yuma County e-rate subsidies average 84% and more than half of all e-rate subsidy dollars go to support "Internal Connections" (*i.e.*, internal wiring and customer premises equipment such as routers and LAN equipment) in schools that are at the 80% or greater discount level. E-rate does not fund public infrastructure and places careful limits on school or library WAN subsidy possibilities.

Recent attention to reducing fraud and waste in the e-rate program has resulted in significant changes to the program that will have their greatest effect on the poorest and most rural schools, beginning in program year 2005. Beginning in that year, schools that had been able to apply for internal connectivity funding (which typically accounts for half of the subsidy amount received) on an annual basis will be limited to applying only two years out of five and there will be new restrictions on maintenance funding:

##### Upgrading or replacing Internal Connections.

Applicants can receive funding for internal connections no more than twice every five funding years. This rule will become effective beginning with support received in Funding Year 2005. So, after the current application cycle (Year 2004), during any 5 year period, eligible participants can only apply for internal connections twice. However, application doesn't mean a guarantee of funding. The funding caps will still apply. So, if an organization applies twice in a five-year period and is at the 81% discount level both of those years and SLD cuts off funding at 83%, they still won't receive funding for internal connections.

##### Basic maintenance on Internal Connections

Maintenance requests will continue to be funded as internal connections but won't be subject to the twice-every-five years funding rule. Participants will be able to apply for maintenance every year. But, again, the funding caps will remain in place. This rule will become effective immediately. Because of waste, fraud, and abuse, the FCC has clarified basic maintenance costs for internal connections. SLD will approve basic maintenance if the maintenance is necessary for the connection to function and serve its intended purpose with the degree of reliability that non-school customers would receive.



Basic maintenance services do not include services that maintain equipment that is not supported or that enhance the utility of equipment beyond the transport of information, or diagnostic services in excess of those necessary to maintain the equipment's ability to transport information.

For example, basic maintenance will include repair and upkeep of previously purchased eligible hardware, wire and cable maintenance, and basic technical support, including configuration changes. On-site technical support is not necessary to the operation of the internal connection network when off-site technical support can provide basic maintenance on an as-needed basis. Services such as 24-hour network monitoring and management also do not constitute basic maintenance. Such services are therefore ineligible for discounts under the schools and libraries universal service mechanism.

Technical support, including on-site Help Desks, is not eligible under the FCC's rules if it provides any ineligible features or functions. If a technical support contract provides more than basic maintenance, it will be ineligible for discounts.

The crack-down on fraud and waste has also resulted in several indictments and a Congressional investigation which is expected to begin hearings early in 2004. At least one Arizona vendor has received a letter from House Energy and Commerce Committee Chairman Billy Tauzin (R-LA) and Oversight and Investigations Subcommittee Chairman James Greenwood (R-PA) requesting detailed responses to a series of questions about how they conduct their e-rate business.

[http://energycommerce.house.gov/108/News/07142003\\_1028.htm](http://energycommerce.house.gov/108/News/07142003_1028.htm) Tauzin, however, recently announced his intention to retire, and the possibility of a congressional investigation into e-rate fraud and waste appears to be diminishing.

Calling e-rate a "hidden tax," U.S. Congressman Tom Tancredo (R-CO) reintroduced legislation (H.R. 1252) in the 108<sup>th</sup> Congress (2003) that would terminate the e-rate program of the Federal Communications Commission (FCC) to impose a mandate on telecommunications providers that supply information technology services for schools and libraries at a discounted rate. Rep. Tancredo originally introduced the bill in the 106<sup>th</sup> Congress. Although Tancredo's bill has never made it out of committee, several indictments arising out of the fraud and waste investigation and the upcoming Congressional hearings make it likely that significant changes to the program may occur when the program's future is considered again in Congress.

E-rate average annual funding commitment for the State of Arizona 1998-2002 was \$45,999,675.26. E-rate funding commitments for schools and libraries in Yuma County in program year 2002 (the last complete program year) totaled slightly more than \$1.2 million for internet access and telecom services. Almost \$10.5 million in e-rate subsidy was committed for Internal Connections funding in Yuma County from program years 2000 to 2003 (much of it received by the Crane Elementary District). With the upcoming changes in how internal connections funding is made available, both counties are likely to see reductions in Internal Connectivity funding support. There may also be some redistribution of Internal Connections funding opportunities to schools which previously could not qualify due to the program's restriction (determined by funding availability) to schools with discount rates of 80% or higher.

As described on its website (<http://www.sl.universalservice.org/>), E-rate is:

*The E-rate - or, more precisely, the Schools and Libraries Universal Service Support Mechanism - provides discounts to assist most schools and libraries in the United States*

*to obtain affordable tele-communications and internet access. Three service categories are funded: Telecommunications Services, internet Access, and Internal Connections. Discounts range from 20% to 90% of the costs of eligible services, depending on the level of poverty and the urban/rural status of the population served. Eligible schools, school districts and libraries may apply individually or as part of a consortium.*

*The E-rate supports connectivity - the conduit or pipeline for communications using telecommunications services and/or the internet. The school or library is responsible for providing additional resources such as the end-user equipment (computers, telephones, and the like), software, professional development, and the other elements that are necessary to realize the objectives of that connectivity.*

*The E-rate is one of four support mechanisms funded through a Universal Service fee charged to companies that provide interstate and/or international telecommunications services. The Universal Service Administrative Company (USAC) administers the Universal Service Fund at the direction of the Federal Communications Commission (FCC); USAC's Schools and Libraries Division (SLD) administers the E-rate.*

In many rural communities the school is the only high-bandwidth network connection, and in extreme cases, as in the wilds of Alaska, these school connections have even been shared community wide. It is important for smaller communities to consider the aggregate effect of e-rate subsidized network connectivity upgrades by school districts and the possibility of shared connectivity (between the municipality and the school, for example). Grantors of all kinds have taken to looking favorably on shared-use connectivity, so a consortium or shared access model based on the local school's e-rate subsidy is a possibility which should be considered in smaller communities.

See "Cost Allocation Guidelines for Consortia Comprising Eligible and Ineligible Entities" on the SLD website at <http://www.sl.universalservice.org/reference/costaloc.asp>

There is always some talk of ending the e-rate program, but such subsidies are hard to kill and the telecommunications industry now depends on them for rural services in many areas. It may, however, eventually be distributed differently, as a block grant to states administered by the state department of education, for example.

The Universal Service organization also administers a subsidy program for health care facilities funded by the same mechanism.

### **14.3.2 Rural Health Care (RHC) Universal Service**

The Rural Health Care Division of USAC (<http://www.rhc.universalservice.org/>) is responsible for ensuring that health care providers in rural areas obtain the benefits of current telecommunications technology as provided for by the United States Congress and the Federal Communications Commission (FCC) through universal service support. The FCC established a program that will fund up to \$400 million annually so that rural health care providers pay no more than their urban counterparts pay for the same or similar telecommunication services.

The Rural Health Care subsidy program is not a first-dollar subsidy program, as is the e-rate program for schools and libraries. Instead, it provides a subsidy for the high cost elements of

rural service by comparing the rural costs to costs in a nearby urban area, and then subsidizing the difference, effectively equalizing the price of telecom service for health care providers in urban and rural settings. The Rural Health Care Support Mechanism calculates support using one of two methods: using only a mileage-based calculation, or by comparing the differences between urban and rural rates. Applicants may choose the method based on which is easier, or which provides the most support, according to their own circumstances. Those who choose urban/rural rate comparison will receive support equal to the difference between what they pay (the rural rate) and what they would pay if they were receiving the service in the nearest large city of 50,000 or more (the urban rate).

<http://www.rhc.universalservice.org/applicants/abouturban.asp>

USAC funding commitments for Rural Health Care Universal service in Arizona have varied in recent years:

2003 Arizona Commitments Total = \$ 188,000 (YTD 6/2003-6/2004)  
2002 Arizona Commitments Total = \$1,179,985  
2001 Arizona Commitments Total = \$ 672,747

USAC public records show no participation from Yuma County in program year 2003, and only a single clinic in Wellton receiving a subsidy (of less than \$20) in each of the preceding two cycles

Internet Service is now eligible for FY 2004 (03/26/04)

As a result of recent Federal Communications Commission (FCC) action, health care participants may be eligible to receive a 25% discount on their monthly internet service charges. These services are limited to the monthly internet net access charge, monthly charges for web hosting and web addresses. Eligibility for this discount is open to all rural non profit HCPs. In addition, Emergency Departments of for profit rural hospitals are eligible.

#### 14.4 Federal Grant and Loan Opportunities

The following federal departments and agencies provide grant and or loan funding for telecommunications and telecommunications related projects. Some of the information presented is based on FY2003 and FY 2004 programs whose application deadlines have passed, but whose programs are expected to continue. If a particular grant opportunity fits your need, remember to sign up for electronic program reminders through the Grants.gov system. (More information on this follows in the Federal Grant Program Information and Resources section.) Also, please note that some of these federal programs are administered through Arizona state agencies and administrative offices.

**DUNS Numbers:** Having a DUNS number is a new requirement for all federal grant applications as of October 1, 2003. The Office of Management and Budget (OMB) issued a directive to implement the requirement for grant applicants to provide a Dun and Bradstreet (D&B) Data Universal Numbering System (DUNS) number. The DUNS number supplements other identifiers required by statute or regulation, such as tax identification numbers. You can request and register for a DUNS number by calling 1-866-705-5711

### 14.4.1 Federal Department of Agriculture (USDA)

A good federal source of funding for telecommunications is the Federal Department of Agriculture through several programs:

#### Rural Utilities Service (RUS): Community Connect Broadband Grant Program

This program was a pilot grant program for the provision of broadband transmission service in rural America. The program has not yet been refunded, however if funding is authorized, this will be a good source of funds for broadband. In fiscal year 2002, \$20 million in grants were made available through a national competition to applicants proposing to provide broadband transmission service on a “community-oriented connectivity” basis. The “community-oriented connectivity” approach targeted rural, economically-challenged communities and offered a means for the deployment of broadband transmission services to rural schools, libraries, education centers, health care providers, law enforcement agencies, public safety organizations as well as residents and businesses. The all-encompassing connectivity concept was designed to give small, rural communities a chance to benefit from the advanced technologies that are necessary to foster economic growth, provide quality education and health care opportunities, and increase and enhance public safety efforts. There has been no notice of availability of these program funds for 2004.

#### Rural Utilities Service (RUS): Broadband Loan and Loan Guarantee Program

In FY2003, this program provided \$1.4 billion in loans and loan guarantees to provide broadband services in rural communities where the population was 20,000 or less. The loans are intended to facilitate deployment of new and innovative technologies to provide two-way data transmission of 200 kbps or more, in communities with populations up to 20,000.

<http://www.usda.gov/rus/telecom/broadband.htm>

#### Rural Utilities Service (RUS): Distance Learning and Telemedicine Grants

This program provides grants, loans, and grant/loan combinations to rural entities for distance learning and telemedicine. Funds can be utilized for equipment, computer networks, programming, technical assistance and instruction. For FY2004, \$15 million in 100% grant funding is available from this program (application deadline is 4/30).

<http://www.usda.gov/rus/telecom/dlt/dlt.htm>

#### Rural Utilities Service (RUS): Dial-Up Internet Program

The Local Dial-Up internet Grant Program is designed to provide financing to furnish, in rural areas, local dial-up internet access where it does not currently exist. Grant funds may be utilized for the acquisition, construction, and installation of equipment, facilities and systems. Grants are awarded, on a competitive basis, to entities serving communities of up to 20,000 inhabitants to ensure rural consumers enjoy the same quality and range of telecommunications service as are available in urban and suburban communities.

[http://www.usda.gov/rus/telecom/initiatives/index\\_initiatives.htm#dialup](http://www.usda.gov/rus/telecom/initiatives/index_initiatives.htm#dialup)

#### Rural Utilities Service (RUS): Rural Telephone Bank

The Rural Telephone Bank was established in 1971 as a source of supplemental financing for telecommunications companies and cooperatives eligible to borrow under the RE Act's telephone loan program. The Rural Telephone Bank, in partnership with RUS, provides rural telecommunications companies with financing for the improvement and expansion of telecommunications service in rural areas.

[http://www.usda.gov/rus/telecom/rtb/index\\_rtb.htm](http://www.usda.gov/rus/telecom/rtb/index_rtb.htm)

Rural Business-Cooperative Service: Rural Business Enterprise Grant

This program gives grant funds to public bodies, private nonprofit corporations, and Federally-recognized Indian Tribal groups to finance and facilitate development of small and emerging private business enterprises located in any area other than a city or town that has a population of greater than 50,000 inhabitants and the urbanized area contiguous and adjacent to such a city or town. The public bodies, private nonprofit corporations and federally recognized Indian tribes receive the grant to assist a business. Grant funds do not go directly to the business. Funds are used for the financing or development of a small and emerging business. Eligible uses are: Technical Assistance (providing assistance for marketing studies, feasibility studies, business plans, training etc.) to small and emerging businesses; purchasing machinery and equipment to lease to a small and emerging business; creating a revolving loan fund (providing partial funding as a loan to a small and emerging business for the purchase of equipment, working capital, or real estate); or construct a building for a business incubator for small and emerging businesses.

Rural Development Program: Rural Economic Development Loans

This program provides zero-interest loans to electric and telephone utilities financed by the Rural Utilities Service (RUS), an agency of the United States Department of Agriculture, to promote sustainable rural economic development and job creation projects. The utility is required to re-lend, at zero-percent interest, the loan proceeds to an eligible "third-party recipient" for the purpose of financing job creation projects and sustainable economic development within rural areas. A rural area is any area of the United States not included within the boundaries of any urban area, as defined by the Bureau of the Census.

<http://www.rurdev.usda.gov/rbs/busp/redl.htm>

Rural Development Program: Rural Economic Development Grants

Provides grant funds to electric and telephone utilities financed by the Rural Utilities Service (RUS), an agency of the United States Department of Agriculture, to promote sustainable rural economic development and job creation projects through the operation of a revolving loan fund program. The utility is required to operate and administer a revolving loan fund program using the grant proceeds. The utility can then make zero interest loans to nonprofit entities or public bodies for educational facilities, community facilities, medical facilities, community development projects and business incubators.

<http://www.rurdev.usda.gov/rbs/busp/redg.htm>

#### **14.4.2 Federal Communications Commission: Tribal Land Bidding Credits**

The FCC provides bidding credits to telecommunication carriers to help offset some of the costs of providing telecommunication services on tribal lands. The program was developed to assist people living on tribal land to acquire telecommunications services through overcoming some of the financial hurdles posed by bringing telecommunications services to sparsely populated, remote areas. <http://wireless.fcc.gov/auctions/tribal>



### **14.4.3 US Department of Commerce, National Telecommunications and Information Administration Technology Opportunities Program (TOP)**

The Technology Opportunities Program, formerly known as the Telecommunications and Information Infrastructure Assistance Program, is a highly competitive, merit based grant program that funds innovative technologies, including practical applications of new telecommunications and information technologies. TOP makes grants to state, local, and tribal governments, health care providers, schools libraries, police departments, and community based nonprofit organizations. It currently disburses approximately \$12-14 million per year. TOPs funding for FY 2004 is \$12.9 million. Funded projects are model projects which promote widespread availability and use of digital network technologies in the public and non-profit sectors and which demonstrate new or innovative use of technology to meet a community need for services or opportunities. Funded projects typically have an application or programmatic basis, which any proposed infrastructure development serves to facilitate.

The TOPs grant program is unusually competitive. In its most recent cycle, it awarded 28 grants from a submission pool of 569 applications (5%). A list of awardees, with links to brief project descriptions is at <http://ntiaotiant2.ntia.doc.gov/top/awards/index.cfm>. A search of the TOPS grants database at NTIA shows the most recent Arizona awards were made in 2001. The City of Tucson was awarded \$824,644 in funds to create an online collaboration environment for unemployed and under-employed citizens in Tucson to help with training, employment services, and communication with possible employers. The Navajo Technology Empowerment Centers were awarded \$875,000 in funds to establish a digital network for e-commerce development, e-training, and an electronic election system for all Navajo Nation general elections in the Western Navajo Agency. TOPs looks for innovative projects with a one-to-one or better cash match ratio (strictly audited) and a strong evaluation component. Typical TOPs grant amounts are in the \$300-600K range. The average award in the FY 2003 cycle was \$498,000, with the highest award given of \$675,000 and the lowest of \$148,000. TOPS grant funding for FY 2004 has not yet been announced, but should be in the \$12-14 million range of recent years. For more information about TOPS, see their website at <http://www.ntia.doc.gov/top/>.

### **14.4.4 Public Telecommunications Facilities Program (PTFP)**

PTFP is a competitive grant program that helps public broadcasting stations, state and local governments, Indian Tribes, and nonprofit organizations construct facilities to bring educational cultural programs using broadcast and non-broadcast telecommunications technologies. The major focus of the program is to extend the delivery of public radio and television to unserved areas of the United States, however PTFP can fund non-broadcast projects which activate a new public telecommunications facility, target a new and distinct audience, or extend the geographic area of service of an existing public telecommunications facility. Distance learning telecommunications facilities using non-broadcast technologies such as microwave, fiber-optic cable, satellite distribution, and Instructional Television Fixed Service (ITFS) are eligible for funding. PTFP awards funds to purchase equipment required to provide public telecommunications services. Grant funds require a 25% match, however typically PTFP provides no more than 50% of the funds needed to replace, augment, or improve equipment. PTFP can fund planning projects. <http://www.ntia.doc.gov/ptfp/>

### 14.4.5 Department of Education (ED)

The U.S. Department of Education (ED) provides about \$36 billion each year to states and school districts, primarily through formula-based grant programs, to improve elementary and secondary schools and meet the special needs of students. ED provides about \$2.5 billion to help strengthen teaching and learning in colleges and other postsecondary institutions and about \$3.3 billion to support rehabilitation, research and development, statistics, and assessment. The Department of Education does fund some discretionary competitive grant programs – typically projects that are funded need to be focused on an educational objective, of which technology purchase can be a step/part. For more information: <http://www.ed.gov/fund/landing.jhtml?src=rt>

Community Technology Centers Program: The ED Community Technology Centers grant program may allow small rural communities to expand their school-based internet access (and upgrade bandwidth) into a broader community resource. Funding for the Community Technology Centers Program is based on HR 1, the No Child Left Behind Act. As described on the ED website, the purpose of the program is to create or expand community technology centers that will provide disadvantaged residents of economically distressed urban and rural communities with access to information technology and related training. The program promotes the development of model programs that demonstrate the educational effectiveness of technology in urban and rural areas and economically distressed communities. The Community Technology Centers are envisioned as providing access to information technology and related learning services to children and adults. More than access, the CTC program seeks to expand learning opportunities and to increase educational effectiveness through technology. <http://www.ed.gov/offices/OVAE/AdultEd/CTC/index.html>

### 14.4.6 Department of Homeland Security

Homeland Security has provided a new source of federal funding which may be of some benefit to rural telecommunications infrastructure. Federal domestic funding for homeland security topped \$42 billion in FY 2003 and continues funding into FY 2004. Homeland Security funds are routed through not less than 14 different federal agencies and take the form of at least 45 aid programs. Each congressional appropriation is tied to a specific federal agency charged with the responsibility of disseminating the funding according to the legislation that created the program.

Health care, emergency preparedness and public safety communication have been observed as priorities for Homeland Defense funding. In practice, however, large grant requests have been met with relatively low funding. A June report in the Arizona Republic noted that the state's \$38.6 million in Homeland Security Grants was "in line with the national average but paltry considering that Maricopa County cities alone asked for \$46 million". ["Ariz. terror funding assailed"; Stephanie Paterik, The Arizona Republic, Jun. 30, 2003] State officials divide the State grant up among Arizona agencies and counties, and the counties distribute the funds to cities. Awarded grant proposals included a plan for radio equipment for the state that would allow multiple agencies to communicate with each other. It was reported also that counties along the Mexican border got a bigger share this year. According to the Arizona Republic article, the governor has said that protecting the border and encouraging regional cooperation are at the top of her to do list. Coordination of communication infrastructure efforts across all recipients



will be a key element of any regional cooperation that may be developed. The programs with some benefit to telecommunications are listed below:

Office for Domestic Preparedness: State Homeland Security Grant Program

The State of Arizona will receive \$31.49 million in FY2004 to spend on planning, equipment acquisitions, training, and exercises for a variety of Homeland Security projects, including Cyber Security and Infrastructure (including telecommunications infrastructure) assessment and target hardening. 80% of the total funds must be passed through to units of local government. Information on these grants can be found at: <http://www.homelandsecurity.az.gov>. This re-granting process is being developed on a state level under the direction of:

Frank Navarrete  
Director, Arizona Office of Homeland Security  
1700 W Washington  
Phoenix, AZ 85007  
Phone: 602-542-7013  
Fax: 602 364-1521

Office for Domestic Preparedness: Law Enforcement Terrorism Prevention Program

The State of Arizona will receive \$9.344 million in FY2004 to spend on information sharing to preempt terrorist attacks, target hardening to reduce vulnerability, threat recognition, intervention activities, and interoperable communications. Eighty percent of the total funds must be passed through to units of local government. Again, this re-granting process is being developed on a state level under the direction of Frank Navarrete, Director, Arizona Office of Homeland Security (see contact information above). Information on grant opportunities should be posted at <http://www.homelandsecurity.az.gov>

#### **14.4.7 Department of Justice (DOJ)**

Department of Justice (DOJ): Interoperable Communications Program

The COPS program was appropriated \$74 million in FY2003 (FY 2004 are yet to be determined) for communications interoperability which it awards through a discretionary program directed at first responders homeland security communications needs. In its first year of funding, the COPS office invited the largest Metropolitan Statistical Area from each state as well as the 50 largest MSA's to apply for initial funding for a total of 74 applicants. If this funding source is reauthorized in the future, there is the potential for funds to "trickle down" to other urban and rural areas. <http://www.cops.usdoj.gov>

Department of Justice (DOJ): Local Law Enforcement Block Grant Program (LLEBG)

LLEBG program dollars are formula based grants which provide funds to units of local government for projects which reduce crime and improve safety. Funds can be spent on procuring equipment, technology, and other related items. Funds are allocated by a formula and are awarded directly to units of local governments who apply. Applications are typically due in late spring or early summer. More information on the program can be found at [http://www.ojp.usdoj.gov/BJA/grant/llebg\\_app.html](http://www.ojp.usdoj.gov/BJA/grant/llebg_app.html)

Department of Justice (DOJ): COPS More

The Community Oriented Policing Services office offers grants to help law enforcement agencies improve their operations through staffing and equipment. The COPS More program specifically focuses on acquisition of new technologies and equipment which promote efficiency and innovative approaches to solving crime and which increase officers deployed in community oriented policing because of time savings achieved from technology. Both mobile computing and video arraignment are fundable project areas.

<http://www.cops.usdoj.gov>

Office of Justice: Crime Identification Technology Act (CITA)

CITA provides assistance for virtually every technology based, criminal justice information, identification, and communications need. CITA funds also may be used to support state and local participation in national databases. States, in conjunction with local governments, may use funds awarded under CITA to improve or expand criminal justice technology efforts.

[www.ojp.usdoj.gov/cita](http://www.ojp.usdoj.gov/cita)

NIJ Advanced Generation of Interoperability for Law Enforcement (AGILE) Program

The AGILE program addresses a broad range of interoperability issues across jurisdictional and regional boundaries. The AGILE program includes communications technology development, evaluation, development of open architecture standards, and an education campaign.

[http://www.nlectc.org/agile/grants\\_funding/justnet.html](http://www.nlectc.org/agile/grants_funding/justnet.html)

Federal Emergency Management Agency (FEMA), Emergency Management Performance Grants (EMPG)

EMPG grant funds assist the development, maintenance, and improvement of State emergency management capabilities, including disaster mitigation, preparedness, response, and recovery. Functional areas supported by the grant include communications and data sharing.

<http://www.fema.gov/preparedness/empg.shtm>

#### **14.4.8 Department of Health and Human Services**

The Department of Health and Human Services (HHS) has approximately 300 grant programs, most of which are administered in a decentralized manner by several agencies. For more information on all grant programs: <http://www.hrsa.gov/grants/preview/default.htm>

Nursing Education, Practice and Retention Grants (NEPR)

NEPR grants are awarded to projects which strengthen and enhance the capacity for nurse education, practice and retention to address nursing shortages. Priorities include providing education in new technologies, including distance learning methodologies and enhancing collaboration and communication among nurses and other health care professionals. Funds can be utilized to pay for technology and telecommunications which leverage desired outcomes for nursing education and retention.

<http://fedgrants.gov/applicants/hhs/hrsa/gac/hrsa-04-014/grant.html>

Institute of Museum and Library Services National Leadership Grants for Libraries

Leadership Grants are awarded to nonprofit organizations and institutions of higher education for several areas, including education and training of persons in library and information science, particularly in areas of new technology, research and demonstration projects related to the enhancement of library services through effective and efficient use of new technologies, the

preservation or digitization of library materials and resources, and preserving and enhancing access to unique library resources useful to the broader community. More information on Leadership grants can be obtained at <http://fedgrants.gov/applicants/imls/opla/opla/ngl-Lib/grant.html> or by calling (202) 606-8537 or emailing [imlsinfo@imls.gov](mailto:imlsinfo@imls.gov)

Economic Development Administration Public Works Program:

The Public Works Program empowers distressed communities in economic decline to revitalize, expand, and upgrade their physical infrastructure to attract new industry, encourage business expansion, diversify local economies, and generate or retain long term private sector jobs and investment. Past projects have included technology related infrastructure, distance learning facilities, and commercialization and deployment of innovative technologies.

<http://www.eda.gov/InvestmentsGrants/Pgmguide.xml>

Economic Adjustment Program

The Economic Adjustment Program assists state and local interests design and implement strategies to adjust or bring about change to an economy. The program focuses on areas that have experienced or are under threat of serious structural damage to the underlying economic base. The program predominately supports three activities – strategic planning, project implementation, and revolving loan funds. Activities can include construction of infrastructure improvements or loans to local business, which serve to help a community to diversity and stabilize its economy.

<http://www.eda.gov/InvestmentsGrants/Pgmguide.xml>

## 14.5 State Grant Opportunities

### 14.5.1 Arizona Department of Commerce (ADOC)

While no State of Arizona financial assistance programs currently exist for the express purpose of improving rural community telecommunications infrastructure, the Arizona Department of Commerce has recently administered grants for Community Telecommunications Assessments. The products of these assessment grants include reports that could be valuable to county and local governments statewide for telecommunications infrastructure planning and development. The documentation includes a broadband technology study for the Community Telecommunications Assessment Program, and countywide assessments in four Arizona counties.

### 14.5.2 Community Development Block Grants (CDBG)

CDBG (administered by the AZ Department of Housing) is one example of a variety of federally-funded, state-facilitated grant and low interest loan programs which might assist in such efforts. Unfortunately, most of these address remediation of more traditional infrastructure needs such as housing, commercial economic development, and public works projects (parks, community centers, water systems). The Community Development Block Grant (CDBG) program is an example of these. However, CDBG's stringent demographic requirements and urban focus make it unsuitable for a wide-area technology infrastructure funding. CDBG may be useful in individual communities which can meet its national objectives, which include qualifying under the Low-Moderate Income National Objective, which requires at least 51 percent of the beneficiaries must be low to moderate-income persons. Telecommunications infrastructure may

be included as a benefit, but may not qualify as the central purpose of a proposal. Public housing projects can include network access wiring, for example.

The CDBG program's inability to address rural telecommunications infrastructure issues has been noted. The Council of State Community Development Agencies (COSCDA) has included it as an issue in its Federal Advocacy Priorities for Fiscal year 2004:

***Modify CDBG to Allow Rural Telecommunication Programming***

***Issue:*** Many rural areas have community development needs that include critical development of rural telecommunications systems. Poor rural communities find it difficult to attract private investment without rural telecommunications systems, yet telecommunications companies hesitate to install "broadband" systems in rural areas because no private companies are ready to use them. This "catch-22" is hurting community development in some rural areas. Yet, states wanting to help these rural communities have found that the design of the CDBG program often prohibits the use of CDBG funding for these rural telecommunication projects, because when large geographic areas are involved, some areas do not meet certain CDBG income eligibility tests.

***Recommendation:*** COSCDA calls for a modification in the CDBG statute to allow rural telecommunication projects to be eligible if a significant number of low-moderate income people are expected to be served by the project. States would determine the number of expected beneficiaries that would be considered "significant" based on demographic analyses of their state, and include this definition in their Consolidated Plan. <http://www.coscda.org/membersonly/03legpriorities.pdf>

For more information on the Arizona CDBG program see <http://www.housingaz.com/sihirtestpreview.asp>.

The willingness and extent of success in applying to such programs will depend upon a variety of factors, including the relative priorities of competing needs within the applicant community, competition from other communities' proposals, and the willingness of applicant communities to provide local cash match.

### 14.5.3 Government Information Technology Agency (GITA)

GITA is responsible for statewide information technology planning, coordinating, and consulting. The GITA Director serves as the Chief Information Officer for state government and has the responsibility to administer the state's Executive Branch IT resources. GITA will be responsible for the development of future state administered funding supports or incentive programs for telecommunications infrastructure development, although these may be administered through GITA coordinated programs within the Arizona Department of Commerce and other agencies. Currently GITA is drafting legislation that would allow the establishment of local telecom authorities that would be able to issue bonds for local/regional middle-mile and last mile telecommunications infrastructure projects.

<http://gita.state.az.us/telecom>

#### **14.5.4 Arizona Criminal Justice Commission: Department of Justice (DOJ): Edward Byrne Memorial State and Local Law Enforcement Assistance (Byrne Grants)**

Byrne grants are awarded to the State of Arizona for use by the State and units of local government to improve the criminal justice system, and include the use of technology and telecommunications to improve law enforcement functions. Grant may be used to provide personnel, equipment, training, technical assistance, and information systems for criminal justice and law enforcement. Funds are allocated by formula to states and the state administering agency in turn sets its own application procedures for sub-grants to state and local governments. Byrne grant dollars are re-granted to local units of government under the direction of the Arizona Criminal Justice Commission. In Arizona, Byrne funds are re-granted for the purpose of assisting units of state and local government to develop and implement programs and projects that enhance and supports the 2004-2007 Arizona Drug, Gang & Violent Crime Control Strategy, approved by the Arizona Criminal Justice Commission.

<http://www.acjc.state.az.us/grants/index.html>

#### **14.5.5 State Library Program**

The State Library Program is a federal program which makes grants to state library administrative agencies which expend the funds directly and through sub-grants to local libraries for establishing or enhancing electronic linkages among or between libraries, electronically linking libraries with educational, social, or information services, and paying costs for libraries to acquire or share computer systems and telecommunications technologies, among others. Although these funds typically do not address local infrastructure issues, they can be used to upgrade the bandwidth capability of a site, to participate in an aggregation scheme, and to provide some collective assistance in generating the community demand or "business case" which some vendors require for infrastructure upgrade. In Arizona, the State Library Program is administered by Arizona State Library, Archives and Public Records.

<http://www.dlapr.lib.az.us/about/annualreport.cfm>

#### **14.5.6 Arizona Department of Education**

The Arizona Department of Education has both technology support programs and Federal funding pass-through programs (such as Title I funding for schools).

<http://www.ade.state.az.us/programs/technology.asp>

#### **14.5.7 State Tax Credits**

There are currently no programs in Arizona for State Tax credits in return for investment in furthering connectivity or bandwidth access in rural areas. Tax credit incentives may develop as part of GITA's efforts in the future development of funding and incentive programs for infrastructure development in Arizona. Other states have introduced investment tax credits for network infrastructure development.

One example of such a program is Colorado's Rural Telecommunications Enterprise zone program: <http://www.dora.state.co.us/puc/telecom/rtez.htm>

## 14.6 Private Foundation and Corporate Grant Sources

Foundation grant giving is determined by the income generated by the foundation's endowment, which fluctuates with financial markets and other real investments, so foundation giving in general is down, as is the American economy. Added to this, the internet and technology is no longer a hot area of interest for most foundations. As a result, technology-related grant giving has become more focused on "warm puppy" projects such as inner-city computer labs and assistance to girls and boys clubs with technology access, and not to any community-wide infrastructure issues.

In general, private foundations are not good sources for community telecommunications infrastructure development, but should be pursued for what they can offer in terms of public access (computer labs, etc.) and educational/social service application support. For example, Microsoft and Intel community relations assistance in Arizona has included much-needed technology training programs for teachers and administrators, as well as student programs. National companies with significant local presence in Arizona (such as Intel) will usually target grant programs to communities in which they have facilities and employees. Company foundations tend not to award grants in states or communities where they have no operational presence. Grant seeking organizations in every community that has a cable system should contact or meet with community relations staff of their provider periodically to discuss potential areas of community support. Here are a few examples of national and localized (to Arizona) national foundation programs:

### 14.6.1 Public Safety Foundation of America

This private foundation provides competitive grants of up to \$100,000 to support projects that are specific to the receipt and processing of 911 calls from wireless telephone devices. For more information, call (386) 322-2500 or go to the PSFA website: <http://www.PSFA.us>

### 14.6.2 Qwest Foundation

The Qwest Foundation awards grants to 501(c) (3) nonprofit organizations for County Education, Economic Development, and select community based programs. Projects are reviewed on an invitation-only basis. Project ideas that fit the guidelines can be submitted in a brief letter of inquiry, requesting an invitation to apply. Qwest looks for projects that support the community and generate high impact and measurable results. Their specific guidelines for eligible projects include those which support community-based development programs that promote economic growth; support community programs that build the capacity of organizations to provide service; and support the United Way.

<http://www.qwest.com/about/company/sponsorships/foundation/>

### 14.6.3 Bill and Melinda Gates Foundation

The Bill and Melinda Gates Foundation is one of the largest foundations in the world. The Foundation has numerous programs, some of which benefit telecommunications. The



Broadband Connectivity grant, funded through the Bill and Melinda Gates Library Program, provides public libraries, library consortia and regional library networks with a fifty percent cash match towards first-time installation fees and equipment necessary to obtain a broadband connection. Broadband is defined as a connection speed of 200 Kb or greater. Funds can also be used to upgrade regional library networks to improve internet connectivity to all libraries on the network, even those that may already have broadband connections. Grant funds can only be used towards the cost of installation for a new or upgraded broadband internet connection. Grant funds cannot be used for recurring internet or telecom fees. In general, most installation charges are eligible. <http://www.gatesfoundation.org/default.htm>

#### **14.6.4 US Cellular**

The US Cellular *Connecting With Our Communities* program provides monetary contributions to nonprofit organizations in communities with a US Cellular presence in the areas of civic and community, education, health and human service, environment, and arts and culture. [http://www.uscc.com/uscellular/SilverStream/Pages/a\\_charitable.html](http://www.uscc.com/uscellular/SilverStream/Pages/a_charitable.html)

#### **14.6.5 Intel Corporation (Arizona)**

The Intel Corporation focuses its funding on education, with specific objectives of improving science and math education, improving the use of technology in the classroom, broadening access to technology, and encouraging women and minorities to enter technical careers. Intel supports selected projects through equipment, cash, and volunteers. For more information on programs: <http://www.intel.com/community/arizona/education.htm>

#### **14.6.6 Motorola Corporation (Arizona)**

Motorola funds education, diversity, environmental, and technology projects in Arizona. Projects are selected based on the project's ability to meet program guidelines and fulfill Motorola's business objectives. <http://www.motorola.com/us/arizona/giving.html>

#### **14.6.7 Microsoft Corporation**

The Microsoft Corporation has a global initiative called "Microsoft Unlimited Potential (UP)" which focuses on improving lifelong learning for disadvantaged young people and adults by providing technology skills through community technology and learning centers (CTLCS). Microsoft believes that providing technical skills training to disadvantaged individuals, will create social and economic opportunities that can change peoples' lives and transform communities. Last year alone, Microsoft and its employees gave more than \$246.9 million in cash and software around the world to help people and communities realize their potential. <http://www.microsoft.com/giving/display.asp?page=Strengthening>

### **14.7 Other Potential Financing Mechanisms**

Telecommunications projects are large, often complex projects, which typically need more funding than is available solely through existing grant and loan opportunities. To the degree that a project has a solid business plan with project sustainability, it may be able to secure venture capital funding. To the degree that a telecommunications project is viewed as basic community



infrastructure, agencies of local government may be able to secure additional financing through traditional financing alternatives that are typically available for capital improvement projects. Financing alternatives include:

### **14.7.1 Venture Capital Funding**

Access to capital is one of the most critical foundational elements for creation of new entrepreneurial or high tech companies. The uncertainty of the traditional private equity markets and the consolidation of local financial service providers have made it very difficult for early stage companies to find funding as more venture capital funds are flowing to later stage companies. PriceWaterhouseCoopers has compiled information on Venture Capital Funding in Arizona: [http://www.ventureeconomics.com/vec/stats/2003q2/state\\_AZ.html](http://www.ventureeconomics.com/vec/stats/2003q2/state_AZ.html)

Arizona currently has a low level of venture capital funding; however the State is beginning to address this need. The Governor's Council on Innovation and Technology, in concert with the Flinn Foundation capital formation workgroup, has developed recommendations to facilitate formation of and access to capital. These recommendations include establishing an Arizona Small Business Opportunity Program as a tax credit program to encourage angel investing, establishing the Arizona Venture Capital Program through developing a \$100 million pool of funds capitalized by the private sector with state tax credit support. In addition to the Venture Capital Fund, recommendations call for creation of a Native American/Rural Technology Fund which would be a source for direct, syndicated or matching investments in ventures designed to develop employment and infrastructure opportunities for tribal and rural citizens and unique investment capital assets for Arizona's technology community. Implementation of these recommendations will increase potential venture capital funding for telecommunications projects in Arizona.

### **14.7.2 Sales Tax**

Jurisdictions have the option of developing specialty taxes. The tax can be placed on specialty uses, and can be targeted towards uses that primarily depend on non-residents. For example, one small Colorado community has a ½ cent sales tax for technology within the school district which is utilized for telecommunications and other technology needs. A sales tax would need to be approved by a vote of the electorate.

### **14.7.3 Bonds**

Revenue bonds, general obligation bonds, municipal property corporation bonds, improvement district bonds, and community facility district bonds are all staples of municipal and county financing mechanisms. Bonds enable a local government agency to fund a capital infrastructure project with borrowed funds that are then paid back over a period of time. Typically bonds require a pledge or dedication of a future revenue stream as a part of the bond agreement. Many bonds must be approved by a public vote; however some, like the municipal property corporation bonds, do not need a public vote. The Greater Arizona Development Authority has the ability to support bonding efforts for infrastructure development and construction in Arizona. However, recent news of Utah municipalities resisting efforts to use bonds to fund participation

in a regional fiber optic telecommunications infrastructure indicate that municipalities may have different and more immediate priorities for bond funding, due to recent economic pressures.

#### **14.7.4 Impact Fees**

Impact Fees are fees that are charged to a developer to pay for a proportionate share of the cost of providing public facilities and infrastructure within a new development. The legislation surrounding impact fees requires a close nexus between the fee and the infrastructure benefit. Development fees are usually paid during the building permit process with funds going to pay for future development of infrastructure.

#### **14.7.5 User Fees**

User fees can be assessed to the users of a specific service to fully fund or to defray the cost of a project.

### **14.8 Researching Private, State and Federal Grant Opportunities**

It is important to stay “in the loop” on potential funding opportunities, especially given the sometimes very short turn around time between formal announcement and grant deadline. Most grant programs are very similar from year to year, so utilizing information on past funding cycles is a good way to find out what the program will be this year and next year and use this information to develop a competitive program or project. When utilizing the search engines on any of the listed sites, it is often useful to conduct many searches utilizing a variety of key words. For example, some grants will feature the word technology instead of telecommunications. In addition, you can use Google or other search engines, although these are not always as efficient.

#### **14.8.1 Private and Corporate Foundations**

The following websites are a good place to start your additional research on private and corporate foundation grant opportunities:

<http://www.lib.ci.tucson.az.us/grants/> The Tucson –Pima public library has a nonprofit grants and information center webpage dedicated to providing information on grants and grant writing.

<http://www.azgrants.com/home.cfm> This “Just Grants Arizona” website features information on corporate and private foundations that give in Arizona. Access to some of the data requires a membership, other information (and links to funding sources) are free.

<http://fdncenter.org/> The Foundation Center has a national database of private and corporate foundations and their giving priorities and guidelines. You have to pay a membership fee to access much of the data on this site.

### 14.8.2 State Grant Program Information and Resources

Information on grant and loan opportunities from the State of Arizona can be found on various department and agency websites. In addition, remember that many of the federal grant programs utilize state agencies to distribute funds to the local level. Thus, you can often find information about state administered grants on the federal websites as well. This means that State agencies are a good point of contact for both State and Federal grant programs.

<http://www.az.gov/webapp/portal/>

This website is the main portal for Arizona State government. You can use the search capability to look for grants in various areas (education, health, technology, telecommunications, etc.)

<http://www.ade.az.gov/gme/>

Arizona Department of Education grant site

<http://acjc.state.az.us/grants/>

Arizona Criminal Justice Commission grant site

### 14.8.3 Federal Grant Program Information and Resources

All Federal grant programs are listed in the Catalog of Federal Domestic Assistance (CFDA) which is compiled and maintained by the General Services Administration (GSA). The CFDA provides eligibility and program information and lists a specific contact for obtaining additional information and application forms. It also includes a helpful section on writing grant applications. The CFDA is published annually and updated mid-year. If you are interested in viewing the complete, hardcopy text of the Catalog, it is available for reference in the government documents section of most major libraries and in the offices of State and local governments. It is also available on-line: [www.gsa.gov/fdac/queryfdac.htm](http://www.gsa.gov/fdac/queryfdac.htm)

As a part of its e-government initiative, the Federal government has been very proactive in making grant program information available on-line. This greatly simplifies the grant research process. The following websites will list both current and old grant program information. Information on old grants is still valuable, in that it provides grant program information for programs whose deadlines have passed, but where the programs are expected to continue. Thus, while the information might be for the FY2003 program, you can generally count on the FY2004 program being the same. This is extremely helpful for planning and project development, given the usually short to very short window between the formal grant program announcement and the application due date.

<http://grants.gov/>

The grants.gov website is the main portal for federal government wide grant opportunities. It provides information on virtually all of the federal government's discretionary (competitive) grant programs and allows you to search for keywords, find agencies and funding sources that might fit your program, and enroll to receive email alerts when agencies make funding (NOFA) announcements.

<http://www.fedgrants.gov>

The Fedgrants website allows you to search for keywords, find agencies and funding sources that might fit your program, and enroll to receive email alerts when agencies make funding (NOFA) announcements.

<http://www.dhs.gov/grants>

The Department of Homeland Security has launched this interagency grants and training website. DHS grants listed include those administered by the Office of Domestic Preparedness (ODP), the Federal Emergency Management Agency (FEMA), and the Transportation Security Administration (TSA). Other Federal agency programs include the Department of Health and Human Services' public health preparedness grants, Department of Justice grants for counter-terrorism and general-purpose law enforcement activities, and Environmental Protection Agency grants for enhancing the security of our Nation's water supplies.

<http://www.os.dhhs.gov/grantsnet/>

GrantsNet was created by the Department of Health and Human Services (DHHS) Office of Grants Management (OGM) for finding and exchanging information about HHS and other Federal grant programs. GrantsNet provides a variety of Department-wide grants policies governing the award and administration of grant activities, publishing these in grants policy directives, regulations, and/or manuals.

<http://www.usdoj.gov/10grants/>

-----also check <https://grants.ojp.usdoj.gov>

The Department of Justice offers funding opportunities to conduct research, to support law enforcement activities in state and local jurisdictions, to provide training and technical assistance, and to implement programs that improve the criminal justice system. Many of the program bureaus and offices award formula grants to state agencies, which, in turn, sub-grant funds to units of state and local government. Discretionary grant funds are announced in the Federal Register or through program solicitations that can also be found through bureau and OJP Websites

<http://www.cops.usdoj.gov/>

The [Community Oriented Policing Services Office \(COPS\)](http://www.cops.usdoj.gov/) is a Department of Justice program which offers grants to help law enforcement agencies to hire more community policing officers, to acquire new technologies and equipment, to hire civilians for administrative tasks, and to promote innovative approaches to solving crime.

## 15.0 CONCLUSION

This report presents a broad review of the state of telecommunications development and use in Yuma County. However, like a picture taken from a moving vehicle, it cannot claim to have included everything or that it shows the sharpest detail in what it presents. Over the approximately half-year process of observation, the infrastructure was changing, as were events elsewhere that may significantly affect it. To give just one example, in early December, 2003, Qwest's 271 application was approved by the FCC, allowing them back into the long distance market in Arizona. This may lead to cost cutting in the wide area data circuit market in Arizona and should eliminate some of the structural problems previously posed by LATA boundaries.

On the State level, work is proceeding on draft legislation for a Broadband Development Authority and GITA continues its work on a "Statewide Telecom Roadmap." Among other efforts, ATIC also reports efforts toward expediting access to local, state, federal, and tribal rights-of-way, typically the earliest and most persistent stumbling block to infrastructure development.

The report itself presents a platform for action. The initial action called for is a close examination of these findings to discover which are "true" general observations and, more importantly, which deserve immediate and focused action. Longer term, it remains to be discovered whether an entity can emerge from the Consortia membership to take on the five to ten year development task of aggregated infrastructure development that is described in the report's technical plan. Can a unifying principle be found that will allow all stakeholders to work together on these goals?

It is important for the Consortium to take action soon to avoid allowing this document to become "shelf art" by finding approachable tasks and priorities in its broad selection of recommendations.

The process of surveying telecommunications use in the county effectively "stirred the pot" somewhat and may have provided an incentive to vendors to demonstrate good faith efforts at improving their services. It also may have discovered information that would not have been generally known otherwise. The Consortium should expect to hear corrections and comment on the contents of this document from vendors and stakeholders soon after it is made public.

What is most important is the theme in the report of the ongoing need for attention and action if the Consortium is to provide leadership for accelerated development of telecommunications services and infrastructure in the counties and the increased value it would bring to county businesses and residents. Every member of the Consortium should find opportunities for action in these pages.

## **16.0 APPENDICES**

## APPENDIX A – SAMPLE VISION STATEMENT

Logan County, Colorado

### Vision Statement

The following vision statement was drafted, edited, and approved in consultation with the County Commissioners:

To support, by participation, aggregation, and investment, the ongoing development and implementation of a countywide telecommunications network delivering advanced applications and services, including data, voice, and video.

What this will mean in practical terms is an infrastructure that will not present barriers to public and private users accessing advanced telecommunications technologies. The goal is a technology environment that is effectively equal to whatever is available in the most developed urban areas of our state.

The vision statement encompasses the following conditions and values:

- **Future "Scalability", adaptive to rapid changes in technology** - ideally the infrastructure should provide redundancy, "headroom" for advanced service development, and service options encompassing multiple technologies to allow for growth and rapid adoption of new technologies and advanced applications;
- **Cost concerns** - participation must be open to organizations at all budget levels, including the most modestly funded non-profit organizations, with a variety of both low cost and state-of-the-art high performance options made available to participating public sites and to the community at large;
- **Security concerns** - participation by safety, judicial, health care, and government entities may depend on providing multiple security options, including dedicated circuits, when necessary, and the ability to incorporate any new requirements that arise from "homeland defense" efforts;
- **Recognition of industrial requirements** - strong public sector participation will facilitate extension of connectivity to key commercial/agricultural industrial segments already in the County and establish the potential for new industrial development as well;
- **Public safety** - improved network communication such as videoconferencing will allow improved training and operational linkages between professional and voluntary public safety efforts such as police, health care first responders (EMS/EMT), firefighters, and county/region/statewide disaster recovery/homeland defense efforts;
- **Education** - recognize that the presence of a school district in some of the County's small communities presents an opportunity to extend the advantages of connectivity to local government and other public users through shared cost access capabilities within the federal e-rate subsidy program.



- **Health care** - enhance Sterling's position as a regional telemedicine center and discover any technology/infrastructure supports for improving access to health care services of all kinds for residents and health care professionals, with particular attention to improving quality of care and remote support for health care professionals and paraprofessionals within the county;
- **Agriculture** - support innovative uses of new network technologies for agricultural businesses in the County;
- **Resource sharing** - the county telecommunications assessment and plan will allow all public users an opportunity to find infrastructure sharing opportunities that might reduce costs and increase bandwidth access;
- **Resource awareness and use** - the infrastructure implementation should explore greater community awareness and use of underutilized resources such as the videoconferencing capabilities at Northeast Junior College;
- **Attracting additional investment** - increased participation and use of the currently available bandwidth will make a case for additional services and future telecommunications infrastructure development and upgrades in the County;
- **Community development and planning** - telecommunications infrastructure should be considered an essential element of requirements for new development in the County, just as other infrastructure needs, such as water and sewer, are now.

The vision calls for use of the available infrastructure to offer both sophistication and cost flexibility, with a commitment from the community toward resource sharing and ongoing collaborative development for more advanced, more widely available services, as they are introduced. It will bring value to the community by facilitating the adoption of advanced technology in the public sector and by market development (i.e., establishing the whole County as a better customer for telecommunications services) and accelerate the introduction and diffusion of technology in the broader private sector.

**APPENDIX B – MEETING MATERIALS**

- Yuma Sun Article
- Needs Assessment Presentation
- Infrastructure Inventory Presentation
- Technology Plan Presentation

## **APPENDIX C – SURVEY**

- Survey Form
- Survey Results

## Yuma County Telecom Survey

Yuma County, with funding from the State of Arizona is preparing a Community Telecom Assessment in order to determine the current status of our telecom infrastructure, to assess current and future telecom needs and to determine the best strategies to bring advanced telecommunications services to our area. Please fill out this questionnaire and drop off at the following locations or **fax to:**

**Yuma City Hall**  
928.373.4906  
Attn: Anne

**County Admin Building**  
928.373.1050

**Other City Halls   Libraries**

Category: ☐ Residential ☐ Home-Based Business ☐ Business ☐ Town ☐ County ☐ Educational ☐ Medical ☐ Non Profit

**Contact Name** \_\_\_\_\_ **Business Name** \_\_\_\_\_  
City \_\_\_\_\_ Phone \_\_\_\_\_  
# of Employees (in the Yuma County locations): Full Time \_\_\_\_\_ Part Time \_\_\_\_\_ Number of locations? \_\_\_\_\_

**Your local phone company?** \_\_\_\_\_  
# of Voice lines \_\_\_\_\_ #Fax lines \_\_\_\_\_ #Data lines (computer/modem) \_\_\_\_\_ # Computers \_\_\_\_\_ Don't Know/Not sure

**Your cell phone provider?** \_\_\_\_\_

**Your Cable TV or Satellite TV provider:** \_\_\_\_\_

**Your Internet Provider:** \_\_\_\_\_ ☐ Wireless ☐ Satellite ☐ Dial-Up ☐ Cable Modem ☐ Other

**Average Monthly phone bill (local and long distance)** \$ \_\_\_\_\_

**Average monthly cost for cell telephone:** \$ \_\_\_\_\_

**Average monthly cost for Internet services:** \$ \_\_\_\_\_

**Average monthly cost of dedicated computer line:** \$ \_\_\_\_\_

**Do you have any direct connections (data lines) to other locations?** ☐ Yes ☐ No ☐ Type \_\_\_\_\_

**Do you currently have access to the Internet?** at work \_\_\_\_\_ at home \_\_\_\_\_ at school \_\_\_\_\_

**Type of current Internet Connection:**

☐ Dial-Up ☐ Cable Modem ☐ Frame Relay ☐ ISDN ☐ DSL ☐ ATM ☐ T-1 ☐ DS-3 ☐ Wireless ☐ Satellite ☐ Don't Know/Not sure

**Is Internet access critical?** \_\_\_\_\_

**How much additional monthly fee would you pay for Internet access that is 10 times faster than a current dial-up connection?** ☐ \$10 ☐ \$15 ☐ \$25 ☐ \$50 ☐ \$75 ☐ \$100 ☐ \$300 ☐ Greater than \$300

**What bandwidth do you need now and in the next 12 – 18 months?**

<u>Now</u>	<u>12-18 Mo</u>
<input type="checkbox"/> 56 Kilobits per second (Dial-up)	<input type="checkbox"/> 56 Kbps (Dial-up)
<input type="checkbox"/> 256 Kbps (DSL)	<input type="checkbox"/> 256 Kbps (DSL)
<input type="checkbox"/> 512 Kbps (Cable Modem)	<input type="checkbox"/> 512 Kbps (Cable Modem)
<input type="checkbox"/> 1.5 Mbps (T-1)	<input type="checkbox"/> 1.5 Mbps (T-1)
<input type="checkbox"/> 10 Mbps	<input type="checkbox"/> 10 Mbps

Please describe how you currently use the Internet:

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**PLEASE SEE OTHER SIDE**

### Current Overall Satisfaction

<b><i>Please check one in each row</i></b>	Very Satisfied	Satisfied	Neither	Unsatisfied	Very Unsatisfied
Local Telephone Service Provider					
Long Distance Service Provider					
Cellular Telephone Provider					
Television Provider					
Internet Service Provider					

Which Internet services would be valuable to you? (check all that apply)

- |  |   |
|--|---|
| ___ Faster Speed                                 | ___ Tele-medicine                                       |
| ___ e-mail                                       | ___ GIS data sharing                                    |
| ___ Research/Surfing                             | ___ Video Arraignment                                   |
| ___ High-speed data transfer (data, music, etc.) | ___ Data Backup   |
| ___ Video Conferencing                           | ___ Web Hosting/e-commerce                              |
| ___ Training                                     | ___ Link multiple physical locations                    |
| ___ Distance Learning                            | ___ Local and Long Distance Phone service over Internet |
| ___ Tele-health (access to health information)   |   |

We would like to know more about issues with your current providers. What problems do you have because you do not have high-speed bandwidth connections? How would you use a high-speed connection if it were available? If you use a dedicated data line (Frame, ISDN, T-1 and above), please provide details.

Feel free to fax additional pages.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

## Evaluación de telecomunicaciones del Condado de Yuma

El Condado de Yuma, utilizando fondos del estado de Arizona, esta preparando un evaluación de los servicios de telecomunicaciones de la comunidad para determinar nuestra infraestructura actual y así reconocer las necesidades actuales y futuras. Esto ayudará a determinar las mejores extrategias para introducir servicios avanzados de telecomunicaciones a nuestra área. Por favor llene este cuestionario y envíelo al número de fax.(928) 373-4906 Atención: Anne ó deposítelo en los siguientes sitios.

Edificio de Administración del Condado or deposítelo en cualquier Biblioteca

**Categoría:** ☐Residencial ☐Negocio en casa ☐Negocio ☐Ciudad ☐Condado ☐Educativo ☐Medicinal ☐No lucrativo

**Nombre del Contacto** \_\_\_\_\_ **Nombre del Negocio** \_\_\_\_\_

Ciudad \_\_\_\_\_ Teléfono \_\_\_\_\_

# de empleados (En los sitios del Condado de Yuma): Tiempo completo \_\_\_\_\_ Medio tiempo \_\_\_\_\_ Número de lugares \_\_\_\_\_

¿Cuál es su compañía de telefono local? \_\_\_\_\_

# Línea de teléfono \_\_\_\_\_ # Línea de Fax \_\_\_\_\_ # Línea de datos (computadora/modem) \_\_\_\_\_ # de computadoras \_\_\_\_\_

¿Quién es su proveedor de servicio celular? \_\_\_\_\_

¿Quién es su proveedor de servicio de Cable o satélite para TV? \_\_\_\_\_

¿Quién es su proveedor de servicio de Internet? \_\_\_\_\_ ☐Wireless ☐Satellite ☐Dial-up ☐cable-modem ☐otro

Promedio mensual del costo de servicio telefónico (local y larga distancia) \$ \_\_\_\_\_

Promedio mensual del costo de teléfono celular \$ \_\_\_\_\_

Promedio mensual del costo de servicios de Internet \$ \_\_\_\_\_

Promedio mensual del costo de línea dedicada para computadora \$ \_\_\_\_\_

¿Posee otras líneas directas (líneas de datos) a otros lugares? ☐ Si ☐ No ☐ Tipo \_\_\_\_\_

¿Posee acceso al Internet? En el trabajo \_\_\_\_\_ En casa \_\_\_\_\_ En la escuela \_\_\_\_\_

**Tipo de conexión de Internet actual**

☐Dial-up ☐cable-modem ☐Frame Relay ☐ISDN ☐DSL ☐ATM ☐T-1 ☐DS-3 ☐Wireless ☐Satellite ☐No se/ Inseguro

¿Es crítico el uso de internet? \_\_\_\_\_

¿ Cuanto más mensualmente pagaría usted por acceso a Internet 10 veces mas rápido que una conexión de línea conmutada (dial-up connection)? ☐\$10 ☐\$15 ☐\$25 ☐\$50 ☐\$75 ☐\$100 ☐\$300 ☐\$Greater than \$300

Que tanta amplitud de banda necesita actualmente y en los proximos 12 a 18 meses?

- | <u>Actualmente</u>  | <u>12-18 Mo</u>  |
|---|--|
| <input type="checkbox"/> 56 Kilobits por segundo ( <b>Dial-up</b> ) | <input type="checkbox"/> 56 Kilobits per second ( <b>Dial-up</b> ) |
| <input type="checkbox"/> 256 Kbps ( <b>DSL</b> )                    | <input type="checkbox"/> 256 Kbps ( <b>DSL</b> )                   |
| <input type="checkbox"/> 512 Kbps ( <b>Cable módem</b> )            | <input type="checkbox"/> 512 Kbps ( <b>Cable módem</b> )           |
| <input type="checkbox"/> 1.5 Mbps ( <b>T-1</b> )                    | <input type="checkbox"/> 1.5 Mbps ( <b>T-1</b> )                   |
| <input type="checkbox"/> _____ # of T-1s                            | <input type="checkbox"/> _____ # of T-1s                           |
| <input type="checkbox"/> 10 Mbps                                    | <input type="checkbox"/> 10 Mbps                                   |

Por favor describa como utiliza el Internet actualmente:

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FAVOR DE MIRAR EL REVERSO

### Satisfaccion actual en general

<b>Por favor seleccione una en cada renglón</b>	Muy satisfecho	Satisfecho	Ninguno	Insatisfecho	Muy Insatisfecho
Proveedor de servicio telefónico local					
Proveedor de servicio de larga distancia					
Proveedor de teléfono celular					
Proveedor de Servicio para televisión					

**¿Cuáles servicios de Internet serían valiosos para Ud? (Seleccione todos lo que apliquen)**

- ☐ Velocidad más rápida
- ☐ Correo Electrónico
- ☐ Investigación/navegación
- ☐ Tranferencia de datos a alta velocidad ( datos, música, etc)
- ☐ Video-conferencias
- ☐ Entrenamiento
- ☐ Apredizaje a distancia
- ☐ Tele-medicina
- ☐ Sistemas Geográficos compartidos (GIS)
- ☐ Declaratorio por video
- ☐ Respaldo de datos
- ☐ Servidor de página de Internet/E-comercio
- ☐ Encadenamiento de lugares físicos multiples
- ☐ Servicios locales y de larga distancia atravez de el Internet

Nos gustaría saber acerca de otras cuestiones con sus proveedores actuales. ¿Qué problemas tiene usted por no tener una conexión de alta velocidad de banda amplia? ¿Cómo usaría la conexión de alta velocidad si estuviera disponible? Si usted usa una línea de datos dedicada (Frame, ISDN, T-1 u otros), favor de proveer detalles.  
Sientase libre de añadir páginas adicionales.

[illegible]



## ALL COMMENTS ON SURVEY FORMS

### YUMA COUNTY PUBLIC AND PRIVATE

Gadsen	Gadsen Elementary School District #32	Internet is currently used for both educational and administrative purposes for running the Gadsden Elementary School District #32. The internet use for email and communications by students and staff is increasing at a fantastic rate. Within 2years over 2,000 users a day will be accessing the internet through our network. We would currently like to see a little more competition for high speed internet in the San Luis area. We currently would like a DS-3 or better connection to the internet to provide for our growing needs. We are working with both Qwest Communications and Adelphia Communications to provide connectivity both to the internet and our sites. Adelphia is currently leasing us fiber to connect all of our schools and Gig E speeds. We are hopeful that they will be able to provide a high speed internet connection at DS-3 or better speeds in the near future. The local Adelphia office has been very responsive to our specific needs and we look forward to working with them in the future. Qwest has also been responsive to our needs; however they are a bit pricey compared to some other services we have looked at, and their lack of improved services could have us looking for a new provider in the near future.
San Luis	Western Arizona Area Health Education Center, Inc.	Email, terminal services, web access and data transfer.
Somerton	Somerton School District	For educational purposes including reference and research and for administrative purposes such as State and Federal reporting. We also run the following servers: Web, Email, File Sharing, Student Information System (SIS) and we access our financial system which is an Application Service Provider (ASP) through the internet. We use Frame Relay T-1 for voice and data between all of our schools and to our voice and internet service providers. We have very few problems with these circuits and when we do, vendors are quick to get them fixed. Our biggest issue is trying to get our enhanced 911 service approved. I'm referring to the Private Switch/Automatic Location Identification (PS/ALI) service that allows 911 to work correctly on our phone system. Because our 4 locations are connected centrally by T-1 lines, a 911 call from any of our 4 schools shows as being from the district office. PS/ALI corrects this, but our agreement must be approved by the Yuma Metropolitan planning Organization (YMPO) Board which we have been trying to do for almost a year now. In reference to getting this approval, we were told, "This is no big deal - it just takes approval." That was last January and we are still waiting. In the meantime, a delay in emergency response caused by this problem could cause a very dangerous and even fatal situation.
Wellton	Antelope Union High School Dist#50	For student research and filing reports with the Department of Education.
Yuma	Yuma County Bd of Supervisors	Use for Yuma County business, communicate with family, horse shows, 4-H projects, information and research, buy and sell horses. There are times when I cannot access AOL. It rings and rings and does not connect. More speed would be nice, but not critical...I just need to get on when I need to get on.

Yuma	Yuma County Dept of Dev. Services	Research. We have lots of needs, but no ability to get our needs serviced.
		At each of our library locations, we use the internet for work and also we provide Yuma County residents internet access. We have 100+ computers in our District for the public to use for internet access and 70 staff computers. Internet access is vital to our offered services. At present, we do not have any major issues with our current providers. Not having a choice is always a concern and no competition drives the price up. We have 5 Frame Relay T-1 lines and pay about \$2000 per month. We always have to be concerned about network resources and do not allow our users access to audio or video or any downloads. For right now we have the speed we need, but our service is growing by leaps and bounds. We want to be able in the near future to tie all our locations together with VoIP and that certainly will take up some of our resources. It would be great to have excess resources but cost is always a concern. We get our internet access through the Yuma Educational Consortium and I am concerned that they will be able to get what they need to provide good access for all the Yuma County schools and all the libraries. Problems with vendors for them ultimately are problems for us. We are a secondary Tax District and we have to be very careful with our tax dollars. We do not get tax rate increases, so each year we have to do more with less. Computer access to our residents is very important. Many families that we provide service for do not have access to computers in the home. They provide a demand on us that we need to keep up with and try to meet. E-rate funds take the sting out of our telecom costs and allow us to bridge the gap between need and reality.
Yuma	Yuma County Library District	
Wellton	First Southern Baptist	Research and email.
		Communications via email with other AHS sites, city government, etc., to purchase through state contract, do research, etc. As the state changes some of its reporting requirements (via computer), we will need better internet service, but am unsure at this time what will be required.
Yuma	Arizona Historical Society	
Yuma	Yuma Reading Council	Daily admin, state and federal reporting, research. Reasonably priced service; reliable maintenance and service for repair and tech. Ability to have varied services in one facility.

**YUMA COUNTY BUSINESS**

San Luis	We have Qwest T-1 lines between the Sun and our Shopper and Bajo El Sol offices. We use Sprint for our T-1 line to the internet. The biggest problem was getting good lines at the installation of the T-1 lines from Qwest.
San Luis	News, sports, communicating with clients, research.
San Luis	Email, buscar muchas cosas.
San Luis	Email.
San Luis	E-mail and research; communication with our clients.
San Luis	Email, connect to main server in Nogales. Would use faster speed to download, search the web.
Somerton	Email; research; bookkeeping; banking. No problems.
Somerton	Customer communication; occasionally the satellites go down. It wouldn't matter to us, we don't need it for our business.
Somerton	Account services for banks; online payments; bookkeeping; email. Would like quicker downloads.
Somerton	Download info from government agencies; file reports; research; email; banking. Problem is downtime at the wrong times.
Somerton	Research, a little e-mail. No problems.
Somerton	We link our Kansas office to this one online; get our info for meetings online; e-mail; research. We get disconnected. It is not fast enough to download the info and it takes forever to bring up. The link between the 2 offices would be more often and faster. It would be easier to retrieve emails, info.
Wellton	Email, shopping & information.
Yuma	Use internet to find products and email. It is fine the way I have it now.
Yuma	Researching things; finding information about companies that were doing business. Just takes way too long. You are tying up a phone line for hours when you could have it in a few minutes. Use for transmitting billing information.
Yuma	Research, email, intercompany communication with gov't. It would be a lot faster; don't like waiting for it to dial up. Just to get my information quicker; research info faster; getting online faster is the main problem and downloading faster.
Yuma	Information, email. We download some of our forms. Biggest problem is that our connection frequently goes down.
Yuma	Email, billing, searching for information on contracts and travel-type things. The speed and ties up our phone lines - we have a limited number of phone lines since we're out in the county. That is it takes too long to search or download.
Yuma	Look up vendor info when we need to get parts or info on the internet. We do have high-speed; no problems.
Yuma	Research HVAC. It drags the process out; it is too time consuming; we don't have the fiber optics in our area to even entertain the high-speed option. I would use high-speed for data research, email connect to out-of-town engineer, advertise our company better, have our own web site.
Yuma	Architectural drawing, email, downloading. Extremely long downloading time. Would just like to be able to have speed with what I do now.
Yuma	Look at stock market and weather, order parts, download technical info for the shop, email. No problems.
Yuma	Business transactions and research; don't have any problems now; in future might use connection for VPN connection; possibly web hosting.
Yuma	To place and track orders with our manufacturers' email. Have no problems.
Yuma	Research, looking at the weather, email. In future would like to move data from location to another.

Yuma	Email ordering on internet; communicating with our customers. Downloads too slow. Future-just enhance what we are already doing.
Yuma	Not something that is needed. We are connected to the main server so we don't use or need this service.
Yuma	Accessing email. Improving all applications. Internal record keeping would also be better for the customers.
Yuma	Email, stocks.
Yuma	Computer line is for the corporate line.
Yuma	Emails need higher speed for programs with manufacturing of farm equipment. Some programs we can't run or access information because it is too slow. In future would run programs we can't now. I don't know...I just hear people complaining about slow speed. If it was faster, people wouldn't complain.
Yuma	For communicating with our suppliers. No current problems.
Yuma	Email, internet sometimes to worldwide net; no problems.
Yuma	Communication with our manufacturers, customers; research; electronic parts catalogs; placing orders; training; email. No current problems.
Yuma	Purchasing; sourcing parts; track parts; overall research; email. It causes frustration because it is not fast enough.
Yuma	Legal research all day long; bankruptcies, criminal matters, info of defendants, email. No current problems.
Yuma	Email, downloads. It's a pain getting on and off. I would use it for the same things I do now.
Yuma	Research, downloads. High-speed is what I have.
Yuma	Communication with vendors, customers, bids for jobs. My provider is in Tucson, I would prefer a local company, otherwise not needed. I am happy with what we have.
Yuma	To obtain information, search, data transfer between here and our parent company. For people that work from their homes and so they can tele-commute.
Yuma	Search for things.
Yuma	Search for information; email, banking.
Yuma	Purchasing materials; checking freight UPS.
Yuma	In the real estate office, not sure our web site, probably checking it out.
Yuma	To look up the weather - nothing else, no email either. No problems. I don't have any idea, we just really only use it for the weather. It would be convenient to get on quicker.
Yuma	Order materials and email.
Yuma	News, weather, sales department advertising. Everything would be faster than it is with spreadsheets.
Yuma	Car deals, credit applications.
Yuma	Employees use it most, web sites, info from main company.
Yuma	Email.
Yuma	Entering items on sales; entering job openings; store greetings; events. No problems.
Yuma	We look up web sites for the appliances that we sell; to put customer info in; email; banking; bookkeeping; payrolls. Our customers have to wait extra info to come up. In the future would like to get our work done faster, the speed for the customer's paperwork can be done faster, we can retrieve info faster.
Yuma	Paying bills; looking for info that we need; email. Just for the convenience of it being faster, it would take me less time.
Yuma	Look for suppliers, contacts, purchasing, paying bills, maintain contact with main company. I have no issues. I believe we have this

	[high-speed].
Yuma	Mainly email; some online research. I can't do a lot of online or accounting information. I would be able to do more on the online accounting information that I need; be able to back up info.
Yuma	Monitor web site; email; research; check out competitors; find services. Just the time factor is a problem. It's pretty slow..I'd like to have faster service. Well, it would let me access everything faster. I would get more done & have more time for researching competitors services that we need we could also use it for e-commerce.
Yuma	Direct deposit 401K; email. We wouldn't use it any differently than we do now.
Yuma	Communication within different branches; email; research general credit histories.
Yuma	Only email; it is too slow for anything else. I don't know but it would be fun to have high-speed now; it would be only a dream, it is not available in my area.
Yuma	To contact suppliers; payment. I wouldn't use it much differently than I do now.
Yuma	E-mail, taxes-they have to send them every week through the internet.
Yuma	Probably wouldn't use it at all except looking up products that I could sell.
Yuma	Email to communicate with others in the industry. It is too slow. Use it daily; every employee uses the internet.
Yuma	To communicate with my wholesaler.
Yuma	Looking up information and connecting with other sites to complete our business. Don't have any problems.
Yuma	Contact customers; ordering things; email. It is extremely slow.
Yuma	Attached to my house for shopping for high ticket items - things you can't get locally; information research. It's not real fast. We get dropped occasionally. Would use in the future to research - products, equipment, trucks; shopping for tickets.
Yuma	Email; no problems.
Yuma	We're a retail business-ordering; we have a website. We have high-speed.
Yuma	To look up medical regulations, illnesses, medications; some email, banking. It is pretty high-speed actually, no problems.
Yuma	Email, internet, find things for my clients. I don't have any problems.
Yuma	Just research, equipment, look up DMV forms, keep in touch with Eloy office. It's fine; would like faster, more reliable.
Yuma	To get 1040 plates for business; emails; dept of motor vehicles. I have DSL and that is enough for me.
Yuma	Receive reservations, credit card reports, commission reports, some banking. Speed - I pay for what I get. It just improves efficiency.
Yuma	Payroll updates; email very minimal. No problems. Satisfied with what we have.
Yuma	Just for email and download.
Yuma	Customer support; take orders over the internet; customer tracking research; communicating w/sister companies and email. Some higher speed options are not available at certain locations...that tends to cause some problems. If future will use for data transmissions to multiple location sites and e-commerce.
Yuma	Direct connection to network for Harley Davidson; includes looking for parts all over the US for customers, web site, some e-commerce; Harley Davidson University for training network in each store.
Yuma	Researching or checking with the bank; shopping as individuals.
Yuma	Just email, nothing else. No problems. We only use internet for emails so what we have is fine.
Yuma	Communicate with customers; email. No problems; don't know what we have but it works and we are happy. Just faster.

Yuma	We maintain our website, email, internet streaming, audio streaming for our radio stations, on-air preparations. It just slows down while downloading. It takes a long time to download.
Yuma	Ordering, looking up stuff, email. It would be nice for it to be a little faster. Over the internet training would be faster; quicker info transferring - we bounce around from different locations so it is very important that we get the info quickly.
Yuma	Downloading commercials; sending commercials to clientele; email; research. No problems.
Yuma	Usually to check banks or other construction companies, distributors. It's really slow to download.
Yuma	Information search, some communication with email.
Yuma	Banking, ACH reporting, tax functions, e-mail
Yuma	To get email, to find something.
Yuma	Use for email primarily. It is not fast enough to go to websites to do research for parts I need. When I have to find info about vehicles, I have to go home and do it on my cable internet
Yuma	Email, banking; no problems; DSL is high speed.
Yuma	Transfer info between here and corporate office; e-mail; research. If had faster speed would not have as much downtime as I do with Beamspeed.
Yuma	It's our oxygen; this is a news station. We have a T-1.
Yuma	For communication; e-mail. No problems.
Yuma	E-mail mostly, research sometimes.
Yuma	We use it about 2 hours a day for research & email. Would use faster speed to save some time. I don't know enough about it to know how I would use it.
Yuma	E-mail, newspapers, business purchasing and sales. It's just slow. Everything is slow - it takes minutes to download pictures; a lot of waiting. It the future would like to set up a web site.
Yuma	For sales, e-mails to other offices, sending photos over the internet.
Yuma	Credit checks only. Not familiar with high speed; we are satisfied with dial-up.
Yuma	Accessing service manuals; accessing parts; accessing prices; e-mail. Right now no problems. [Faster speed] I guess just save us time.
Yuma	Business, email, collect orders, e-commerce.
Yuma	Mostly for freight and shipping info. We get kicked out all the time.
Yuma	For business, look up equipment & order through the net; do business.
Yuma	Credit reporting; product demonstration; research information; warranty authorization; travel arrangements; cigar buying.
Yuma	Research; e-mail; stock accounts. No problems. Would like quicker response in the future.
Yuma	Real estate listings, email, web pages, open escrows, access tax records.
Yuma	Email; looking for products. Just waiting for it to load and email; transferring stuff.
Yuma	Research.
Yuma	Email. No problems.
Yuma	Networking with other companies. No problems with current provider. Interviewing other companies; transfer documents easier; email faster; more training & lecturing.
Yuma	Mostly just for personal use; get prices; e-mail. Would use [faster speed] for maybe sending pictures over email.
Yuma	Don't have it.

Yuma	Research; email. No problems. I wouldn't do anything different from what I do now.
Yuma	Email, taxes.
Yuma	Email from here to Madison and back for bookkeeping online. We don't have any problems. It would just make everything faster; building info and bringing the info to Madison; instant speed would be the best.
Yuma	Don't have. It is not used - got a virus and it ruined everything.
Yuma	I access websites, INS, Dept of Labor, information on health and wellness, OSA, IRS.
Yuma	Purchasing, sales, email. It is just slow. Problems=time consuming; safety; other people can get into it; receiving viruses. Would like to speed things up; buying and purchasing.
Yuma	Local company matters.
Yuma	We research government webs; payroll law; environmental law, etc.
Yuma	Email. I don't see any problems.
Yuma	We use it for pulling drive-out plates; pulling credit reports from credit bureaus. Satisfied with current ISP; no issues.
Yuma	Use it for everything - orders, information, all applications that we get.
Yuma	Email and place orders.
Yuma	Providers through internet; label service; purchasing; banking. High-speed would make downloading faster.
Yuma	Email, invoicing. Save time; more interested in saving time than anything.
Yuma	Market research; email; downloading graphic proofs. I have enough [BW], I'm fine.
Yuma	No problems; we have an intranet.
Yuma	We do internet training; web pages; looking up web pages; email; news. No problems.
Yuma	Email. No problems. In future would do research, looking stuff up so I don't get bored. I don't know much about high speed.
Yuma	Research, vendors and freight. Use frame relay of T-1.
Yuma	Email and links to Corporate.
Yuma	Looking up other companies; looking up products from other businesses; stock market; email. I guess it's called a patience deal, so with dial-up you have to wait. I think it [high-speed] would be the same but I would be much happier. It would be more efficient and quicker.
Yuma	Line connects to the main company. High speed is available and we have it.
Yuma	We don't need internet.
Yuma	Research; email. No problems. Quicker research.
Yuma	For data retrieval; sometimes research; email; bookkeeping. No problems. We might have problems with our internal servers. Just speed problems.
Yuma	Business, broadcasting stories.
Yuma	Email; we have a webpage; we check that we do some web store business; dealing with government entities online; banking. Sometimes we have trouble with mail; it doesn't always go out.
Yuma	Talking to our Corporate office; email. No problems. No particular advantages [to higher speed].
Yuma	Email; information - vendors, ordering, shopping. It's just slow; it's not always on; can't necessarily dial-in or connect. [Future] like I am now, only quicker to transfer or download data.



Yuma	I rent trucks and rent them nationally. No problems.
Yuma	For legal research; incoming email from out-of-state. We did [have problems] at first - when we would get rain nothing worked.
Yuma	Post a website with an email address; tech support; email. No problems. It wouldn't matter to me - what we have now is fine.
Yuma	Publishing; web sites; transferring files; email; invoices via email; billing. No problems.
Yuma	Data search; purchasing; email. No problems - mine is faster than the internet.
Yuma	Pull up business financial news and information. No problems that I'm aware of. Don't have a clue what the difference [with faster speed] would be.
Yuma	Getting and placing orders. It is kind of slow.
Yuma	Email; research info. No problems. [Faster speed] to save time.
Yuma	Ordering; email. No problems.
Yuma	Buying; processing; research.
Yuma	Look up artwork and companies when we need to outsource something; email. No problems. Can't think of anything other than what we do now.
Yuma	Research only.
Yuma	To retrieve authorizations for insurance-they submit insurance work to the labs to order glasses.
Yuma	Upload websites; control services remotely; handle customers; email; research; banking. Certain times of the day, it seems to hang up; it will take a few minutes instead of a couple.
Yuma	Email, ordering, research.
San Luis	Use the internet to get information about notices; communicate with my family and friends (via messenger/email); research; information about almost anything.
Wellton	Business questions, parts ordering, pleasure.
Wellton	Banking, shopping, research, reservations, maps. The internet is so slow at times that you lose the information and have to start over. It is very frustrating.
Yuma	Transfer of data to customers, receipt of data from sources, sending of studies to clients.
Yuma	Maintain 4 websites, 4 blogs, 3 email discussion groups; administer 2 businesses. To my knowledge, there is no DSL, and certainly no cable modem service in my area. I live at County 12th St and Ave G. Our current dialup provider, Earthlink, claims to provide 56k connection speed, but I seriously doubt that is what we really get. Recently a 10 MB file took over an hour to load; I cannot even view most videos or download MP3s due to the time involved. This seriously hampers my work as well as my ability to communicate effectively with my many contacts in foreign countries. My business is based internationally. My business partner physically lives in England, and our customers come from everywhere. The business is still quite small. We don't have hundreds of employees or bill millions of dollars each year. Still, the lack of availability of a fast connection is of serious concern because we are going to expand a lot due to blog technology, and the ability to further promote our business in that way. We've already seen a 20% increase in our publishing business, just since June, due to the promotion we're doing with blogs. This kind of increase will soon be reflected in the online population overall. More people will be accessing the internet more often because of the ease of publishing a blog, which only takes the expertise of using a word processor and a browser. There is no specialized training necessary; so many more people will want to do this - not only private individuals but also local governments, newspapers, and businesses of all kinds. My personal projection is that in about a year from now, we will have double the people publishing websites compared to the number online right

now. I have considered moving to another area of the state where we would have access to something better than dialup modem service. Because we have an old-style satellite dish here, we could access that type of service, but it is only half a service. Outgoing communications would still need to go over the dialup modem, since we lack an uplink. Even so, we would end up paying three times what we pay now for half the service so this isn't a viable option. Other areas have access to online connections at a reasonable fee. I recognize that costs for establishing physical lines have been the problem in the past in cases such as the cable company refusing to service our area. However, satellite service could be an option for many individuals and micro businesses in remote areas such as mine. I'm aware of the costs for an uplink, and it is most certainly a reasonable investment for a larger business that can provide a viable ISP for Yuma county residents.

## YUMA COUNTY LIBRARY DISTRICT – RESIDENTIAL

[Note: The Yuma County Library District distributed a scaled down (5 question) version of the Telecommunications Survey. Where it was impossible to discern the city of origin, "Library District" was inserted in the city column.]

Dateland	Access is too expensive. Use library for email, research. When I'm not at school (college) it is nice to have the access available without having to drive all the way to Yuma (live in Dateland, AZ).
Library Dist	It's important for library to offer computer access because some people don't have access in their homes.
Library Dist	Use library for internet access.
Library Dist	Use Infotrac - printing - jobs.
Library Dist	Do not use computer at home because it's too slow. Use internet for homework.
Library Dist	Use library computer for business. Access at home would be too slow and too expensive.
Library Dist	To find jobs; use the internet and Word program; to receive and send emails and for entertainment; use the library because there is help for homework.
Library Dist	Internet is too expensive. Use library computer because we don't have one.
Library Dist	Use the library computer to get work done; it is necessary for homework for students.
Library Dist	Internet is too expensive. Use library computer because I can't afford a computer; the only way to do homework is in the school or library.
Library Dist	Internet check; search information; internet is necessary for homework.
Library Dist	Use the library computer for printing - I don't have a printer.
Library Dist	Internet access is too expensive. I use it for the internet to search for things I need for CICISS and to type essays or important assignments. Without computer access, everyone who uses the computers wouldn't be able to look up what they need or type up necessary information. These days to buy a computer, it takes a lot of money and computers are very expensive.
Library Dist	Check emails, do homework. There are a lot of people like me that don't have a computer. Also it is very important to use a computer in these times.

Library Dist	At the library, usually check my email and for some material searches. Not all the people can buy a computer and now the internet is very important.
Library Dist	Internet access is too expensive. I use library computer to get information. I use the library's computers because I don't have one at home and I need to use the computers sometimes.
Library Dist	Access is too slow. Use the library computer to get information and to help me with homework.
Library Dist	Use the library computer for school work. It is useful for students such as myself who need a computer to do school work.
Library Dist	No phone. Use the library computer for a job search. More and more students in this area require the use of a computer for homework and not everyone can afford it.
Library Dist	Computer is too slow. Use the library computer for the internet.
Library Dist	Access is too expensive. Use the library computer for the internet and homework. It is very important for students to be able to obtain information when there is no internet service at home.
Library Dist	Access is too slow. Use the library computer for email and the internet.
Library Dist	Access is too slow. Use the library computer to look for information I still come for books, but most of my trips are for the internet. The library access is important until there are cheap computer and quick access for the San Luis area.
Library Dist	Access is too slow. Use library computer for homework.
Library Dist	Use library computer for spell and grammar check.
Library Dist	Access is too expensive.
Library Dist	Access is too slow. Use the library computer to do homework.
Library Dist	Use the library computer for Infotrac. There will be cases where your computer at home won't work, so the library can help you with a computer.
Library Dist	Access is too expensive. Use the library computer to go on the internet then to get information for my homework. I think the library should give the people an opportunity to use their computer because some people don't have a computer at home.
Library Dist	Use the library computer for learning, entertainment. The library gives everyone the opportunity to learn and research even when they wouldn't be able to at home.
Library Dist	Use the library computer for homework, games.
Library Dist	Use the library computer to entertain myself with the music and games because I'm bored at home.

Library Dist	Access is too expensive. Use library computer for research. Some people do not have a computer and they need it for school work, I know from experience!
Library Dist	Access is too expensive. Use the library computer for homework and pictures. If you don't have a computer, you can come to the library and people use them for things besides entertainment.
Library Dist	Access is too expensive. Use the library computer for the internet.
Library Dist	Access is too expensive. I use the library computer for homework, games and pictures. A lot of people don't have computers so use the library computers.
Library Dist	Use the library computer to look up celebs. Most kids don't have computers at home and want to have fun.
Library Dist	Use the library computer to check email, homework, games. Some people don't have some (computers) at their homes and they can't do research or other stuff, etc.
Library Dist	Use the library computer for homework.
Library Dist	Access is too expensive. Use the library computer just to use it and listen to music or to do homework. You might need to do research on the computer or you just want to search the net.
Library Dist	Access is too expensive. Use the library computer to play games.
Library Dist	Use the library computer for the internet and email. Some people use them (PCs) to get work.
Library Dist	Use the library computer searching for jobs; not everybody has one (a PC).
Library Dist	Use the library computer for internet and music.
Library Dist	Use the library computer for school work.
Library Dist	Use the library computer for homework, research. The library computers help people who can't afford internet access or a computer at home.
Library Dist	I prefer broadband access. Speaking for travelers, your service provides a very cost effective way to communicate.
Library Dist	Use the library computer for email and research. I can find the information for my medicine and parents' illness on line. I can keep in touch with home with email. Have you thought about a donation jar for computer users?
Library Dist	Email not hooked up yet. Libraries should make email & computers available to all.

Library Dist	Full time RV persons. Email to maintain contact with my family and keep track of my finances. The library computers enable us to pay some bills and check our finances in a timely manner. Also correspond with family and friends in different states. We really appreciate being able to do so at the libraries.
Library Dist	Access is too expensive/too slow. I use the library computers for the internet. It is good access for the public.
Library Dist	Email to relatives and friends.
Library Dist	Email.
Library Dist	Catalog - searching when not available at home. A lot of students don't have access.
Library Dist	Research; help readily available at library.
Library Dist	Access is too expensive. Use it for everything - research, ordering, shopping, email.
Library Dist	Information (snowbird).
Library Dist	Use for internet and word processing.
Library Dist	Use for email; do not have a computer.
Library Dist	Check email; to keep in touch with family back home.
Library Dist	At the present time, the library's services may not be as important to me personally, but the importance of convenience and readily availability is.
Library Dist	Email. It's our way of keeping in touch with family and friends back home in Canada. Thank you.
Library Dist	Shopping; email/genealogy searching.
Library Dist	Research. Everyone should be able to research through your library. Convenience when traveling.
Library Dist	Access is too expensive. Use the library computer for everything; to communicate with my family.
Library Dist	Access is too expensive. Email, shopping.

Library Dist	Access is too expensive. Check email, order products. I could not access the internet otherwise.
Library Dist	Access is too expensive. Email and to look up stuff and type.
Library Dist	Internet and college work. Even though I have a computer at home, I am always in Wellton and I live in Roll. It is convenient for me to be able to use the Wellton library's computers. Thank you.
Library Dist	Email, daughter's homework. Not everyone can afford a computer and the students need them for school.
Library Dist	Use library's computer when mine is down. It makes it possible for me to access the internet when I am on the road.
Library Dist	To search for school reports and find that information in a little bit of time. Also my internet is too slow and disconnects by itself sometimes. The library should continue because it helps students with reports and if they stopped some students wouldn't get enough information. Also, some people can't afford or they're too expensive for their budget and that's why they should keep giving the community internet access.
Library Dist	To look for information about anything. My computer doesn't work now so I use the public library and computers are fast and internet.
Library Dist	Use the library computer for internet. The internet is important for access to email.
Library Dist	Access is too expensive. Email and family research. For people like me who can't afford a PC but like to do research and couldn't be otherwise. I can also get email from family who I wouldn't be able to keep in contact with otherwise.
Library Dist	No phone line. Use for email, research. The library's computers are fast and they never break.
Library Dist	Learn; play; email.
Library Dist	Email and bill pay. We travel and internet access is not available in a lot of areas except for the library.
Library Dist	When I'm out in town or have an appointment next door, I use the library's computer. I feel it's important for the community and the younger people that can't, for whatever reason, have a computer at home.
Library Dist	I don't have a phone line. Use the library for email and internet. It helps me keep in touch with family and friends when in Arizona for the winter.
Library Dist	I'm a snowbird and my ISP doesn't have a server in Yuma. I use the library's computer to communicate with my family through email.
Library Dist	My computer and access is too slow at home. Use the library for research. For those of us unable to update software and access to the latest and greatest programs - finances can't keep up with technology. Thanks for having it available!
Library Dist	Access is too expensive. Use the library for email, banking. It is nice to keep in touch with family and friends and of course saving money too.



Library Dist	Use the library's computer to check my email from home as I'm a winter visitor and don't have a computer with me. This is an amazing asset to the traveler. I have used it across the country - wonderful benefit for the public.
Library Dist	Email, bank account.
Library Dist	Use the library for email and the internet. Would be lost without it!
Library Dist	Use the library computer for back up. This is a good service to those who cannot afford an ISP or computer.
Library Dist	Have no telephone. Use the library for searches and banking.
Library Dist	Access is too expensive. Use the library for email and research. For us it's easy, free and convenient, especially for us retirees.
Library Dist	Use the library for email and internet. It's a good way for snowbirds to keep in touch with family and friends -- faster than mail.
Library Dist	Access is too expensive. Use the library computer for searches, internet, check email. It is an important point of access to the world in this area where affordable internet isn't available east of here.
Library Dist	I am a full time Rver. Use the library for email and info. The library is the only readily available access. Thanks!
Library Dist	Need access when I travel. The library is great for residents of the community who don't have computers available any other place. When I'm on the road, I can keep in touch with my family.
Library Dist	There are times when I can't use my computer. The library's computers are a useful resource.
Library Dist	We don't have a land line in our motor home and can't access the internet without a land line. Many people need or want internet or email access but this [the library] is their only method of accessing it.
Library Dist	Access is too expensive. Use the library for internet search and email. The library is convenient.
Library Dist	We do not have a land line in Arizona to access email or internet.
Library Dist	Use the library for email. Gave up our computer when we went full-time Rving. Use libraries wherever we go to check and send email. It's a wonderful service - thank you!
Library Dist	No phone; use the library to email home to family.
Library Dist	Keeping in touch with family at home (out of state). We really enjoy the use of this beautiful library. The staff is so pleasant and helpful. It is a wonderful way to keep in touch with family.
Library Dist	I'm not home long enough to warrant the expense of internet access. Use the library for internet and email. Otherwise I couldn't (nor could all the other users) access the internet and email.

Library Dist	Use the computer for email only. This way I can keep up with friends and family while enjoying winter down here. Many thanks for this availability!
Library Dist	Access is too expensive. Use library for ordering and playing games. There are a lot of people who can't afford it. Like some of the snowbirds that only come down for the winter, like to get their emails too.
Library Dist	My ISP does not have a local number. Use the library for email, web searches. It is great for us snowbirds!
Library Dist	Use the library for support from other users. Many people cannot afford to enrich Bill Gates.
Library Dist	Access is too expensive. Use the library for searches and personal business. It is easy accessibility.
Wellton	Access is too expensive. Use library for medical and science research. The library teaches computer skills to the public, education, employment, Wellton library personnel are excellent computer teachers.
Wellton	Use the library to check email. As we use the internet to check our email, it is our link to family and friends (in Canada; we are winter visitors to Wellton area) at home! We certainly appreciate the wonderful library in Wellton. The staff is very friendly as well!
Wellton	Use the library for banking, shopping and to keep in touch with friends and family when away from home. The library is one of the main reasons we decided to make Wellton our winter home.
Yuma	For email, surf and stay in touch with family members. Very helpful staff at the internet reception. Go out of their way to insure we get what we came in for. Keep up the good work. Many thanks.
Yuma	Use the library computer for email; it helps to keep us in touch.
Yuma	Traveling through; live in Mexico.
Yuma	Use library internet for research and email. Not all people can afford to buy and maintain (monthly service provider fees).
Yuma	No phone connection. Use library for email; this is my only way to access the internet.
Yuma	Use the library internet for email; do not believe the library's access is necessary.
Yuma	No phone at home. Use library internet for email, job seeking, banking. Need to stay in touch with possible employers and job sites.
Yuma	Use the library computer for career resource, paying bills, communications. Many people cannot afford computers or the internet access. It is important to allow people the chance to improve their quality of life by offering the use of computers and the class offerings that you the library gives on computers.
Yuma	Use the library computer to check my email and keep in contact with my family. The library computer is a great service - the people who work here are very helpful in teaching when there is a problem.
Yuma	Use the library's internet access for personal email. Many military personal are stationed in the vicinity. I know it helps me keep up morale and I'm sure that it helps maintain the morale of others who are far away from home. This is also a good resource for reference for students who lack internet access at home.
Yuma	Use the library computer when I am away from home. This is a key resource for community development!
Yuma	Use the library computer to receive and send e-mail; minor research. It's how I stay in touch with people.

Yuma	My computer is damaged; need a new one, but can't afford it right now. Use the library for email, some internet. Need the library to continue to offer computer access so that those of us who need access, whether it be one-time, temporarily or permanently, will have the peace of mind of knowing that we can always count on the Yuma County Library.
Yuma	Use the library for email and research. People who do have slow or no computers need someplace to access the internet. Maybe find a job.
Yuma	Home access is too expensive. Use the library for email and research. I'm on the road a lot and can't get internet access. Doing genealogical research.
Yuma	Word processing, internet - mostly email.
Yuma	Access is too expensive. Use the library computer for children's bible studies.
Yuma	Home access is too expensive. Use the library access for email and searches. As a continuous traveler, I have no other option at this time for internet access.
Yuma	No phone. Use library internet for email and searches.
Yuma	Home internet access is too expensive. Use the library computer for email - good basic communications between family members.
Yuma	Use the library's internet access for searches, voice relay phone calls because I'm nearly deaf. There is no phone port in my RV so this is the only way I can make phone calls. Often need computer searches; very important to me.
Yuma	Access is too expensive. Use the library's computer for banking and personal finance. Need the library for affordable access and study materials.
Yuma	We travel and this is a wonderful service for us while we are away from home. Thank you! Use the internet for email.
Yuma	Use the library for research; it's in a very good location. Access at home is too slow.
Yuma	Use the library to check email when traveling.
Yuma	Use the library when traveling. It is very convenient for out of state and out of country visitors to stay in touch via email and to do online banking. Keep it always.
Yuma	Use the library computer when traveling.
Yuma	Use the library's computer to receive email from home and business while in Yuma for the winter.
Yuma	Have a very old computer at home but no access because it is too expensive. Use the library's computer for printing and typing.
Yuma	Live in a motor home. Use the library's computer for email; need knowledge accessibility.
Yuma	I'm from out of town; this is a great service.
Yuma	I live out of state and I use these computers to check my banking and email.
Yuma	Access is too expensive. Good staff, great help. This is good public service.
Yuma	Don't have hook up here in Yuma.
Yuma	Holidays in C.A. No phone service.
Yuma	Can't afford a computer. Use the library for email.
Yuma	Home access is too expensive. Use library for internet. Sometimes it's the only place to go for computer usage.
Yuma	We travel in an RV and find the libraries are a wonderful way to keep in touch with family and friends.
Yuma	Use library computer to come and do my reports from school and to check my email. This is the only place I could get hold of a computer for school projects.

Yuma	My computer is broken. Use the library's computer for resume and word processing.
Yuma	Use the library computer for travel access - emergencies and general traveler use.
Yuma	Checking email and business; I'm waiting for phone service in RV Park.
Yuma	Access is too expensive. Use library computer for research and to study scriptures. It is too expensive to buy a computer and internet access.
Yuma	I use the library computer to communicate with friends and to work (I'm a writer). I travel to Yuma often for work and I often can't bring a laptop. The library is one of the best around.
Yuma	I use the library computer for school needs and to get onto the internet. People that don't have computers at home can come to the library.
Yuma	Out of town; working for City; need access while traveling. The library provides fair access to people who cannot afford it.
Yuma	I live in a motor home; use the library computer for reading.
Yuma	Job search; the library is the only internet available.
Yuma	Email, searches. Need the library because I don't have a computer.
Yuma	Reports, Resume, email. I always see the computer room full of people -- that means that it is a needed facility for the community and it's nice, clean and quiet in the library.
Yuma	I do not have a computer; use the library for email and news. The library is good for people like me who can't afford a computer and internet.

**YUMA COUNTY RESIDENTIAL**

San Luis	We do not have internet
San Luis	Email; homework; search for information on topics that interest me.
San Luis	Work, entertainment.
San Luis	I use internet to look for information about school work or for play gamers. If somebody has high-speed bandwidth connections, he can work very well with everything. He doesn't have to wait until the computer is ready. Maybe with high-speed you would be more fast and easy.
San Luis	Information, chat.
San Luis	I use the internet to access web sites like porn. I don't have any problems with providers.
San Luis	The problems with the internet are that it is very slow.
San Luis	The problems we have with the internet are that is very slow and disconnects a lot.
San Luis	Use internet at the library.
San Luis	Data base information, all types of major research that deal with my academic everyday life.
San Luis	I use the internet at the library or at school because I don't need it in house because I have not much homework. I have no problem not having high-speed bandwidth connection because I have no internet at home.
San Luis	I use the internet to find information.
San Luis	It takes too long. I would use it well in researches and things I need to do.
San Luis	Yahoo
San Luis	I use internet to communicate with my family and boyfriend. I don't have internet at home. If high-speed connection were available I would use research/surfing, distance learning, emails.
San Luis	I usually use the internet to research, to look up information, most often use Yahoo to look up info and pictures.
San Luis	Once a week.
San Luis	For homework and chat.
San Luis	To do business.
San Luis	To find information about jobs or for entertainment.
San Luis	Don't have a computer; access internet through the library.
San Luis	I use it a little bit and only for important information.
San Luis	Information, email.
Somerton	I currently use the web for research and entertainment. It takes too much time to download information.
Somerton	Use the internet for email, surfing, research, distance learning. Cost is very important. It would be great to have one provider ("local") for all services, at a reasonable cost. Because of cost, we do not have an additional line at home for the internet access. Wireless service would be great, but we live about 10 miles north of the Mexican border and reception on cell phone is inconsistent. At times we get a signal and other times we don't. Can't really rely on cell phones in our area of residence.
Wellton	School. Employed

Wellton	Education and research, as well as email.
Wellton	No computer - I'm not interested.
Wellton	Only at work - don't have a computer at home.
Wellton	Helping with school information, software ordering, and information. My phone line is real slow; only 26.8 Kbps. A high speed connection would really help when it becomes available.
Wellton	Use library for access. I do not own a computer as of yet, but if I did I am all for high-speed connections to take internet classes.
Wellton	Reference
Wellton	Email only.
Wellton	Personal use.
Wellton	Educational, email.
Wellton	Email, research on various information sources, weather, news. I do not have a problem with my dial-up speed usually. However, I do have a problem with unsolicited porno and spam. It is very bothersome. I have been told that there is really nothing I can do about it, short of changing email addresses, which I do not care to do. Plus, I have been told that since I am on the internet quite a bit that they would just start again on the new address. I think if the telecommunications industry wanted to do something about a problem, they should do something about this one!!
Wellton	We have WebTV from MSN TV, so we don't need any of these services. The only real problem is not being able to pick up certain stations that our neighbors receive on their antennas.
Wellton	News, email, weather, on-line banking, misc. search.
Wellton	Email, read news. Dial up is fine.
Wellton	I have no problems. Like my internet provider.
Wellton	Hobby.
Wellton	Email, order merchandise, information.
Wellton	Email and some info.
Wellton	Banking, business, shopping, research and email. Now that I am retired, speed is not as important as a few years ago. I would pay a reasonable amount for an increase in speed. The phone lines allow only 28.8 connection on 56K V90 modem. This is something that can and should be fixed. I am happy with my DirecTV satellite; and using IDT as long distance carrier solved a lot of my phone problems.
Wellton	At present we have no computer - plan to acquire one at some later date.
Wellton	Email only - plan internet use with banking & bill paying service.
Wellton	Browsing and connection with family and friends. High-speed bandwidth is not available in the Wellton area.
Wellton	Weather information, email, news, recipes.
Wellton	None
Wellton	Information, email. Often get disconnected and have to redial. Pages load slowly. Not critical to have high-speed access if the cost is greater than what we have now.
Wellton	We do not have a computer.
Wellton	Entertainment, information, work.

Wellton	For homework.
Wellton	Email, news & weather, browsing, surfing, purchases, product info.
Wellton	Use for general research and email. I download a lot of quite large files and also spend 3-4 hours a day "surfing" most of which is spent twiddling my thumbs while the page loads. TeleSpectra is currently offering wireless broadband in Wellton but their pricing schedule is unrealistic, especially the wide distinctions in bandwidth charges and to claim that installation cost for faster speeds are any different than for slower speed is pure bunkum! I can afford (and am willing to pay no more than \$40 for broadband (512K).
Yuma	Instant message, email, research, reading, banking, shopping.
Yuma	Research, email, school. Satisfied with what I have.
Yuma	At home we do genealogy research. Also do on-line searches for products (books/software) and travel. At work I order office supplies, code books and do code research. Our dial-up access through C2i2 is tedious and extremely slow. It is frustrating when we are doing research and have lost our connection to the site. Our dial up service is slow when there are several users on at the same time and the internet cannot be accessed at all, or getting "kicked off" when we are trying to access information. Sometimes unable to access email to either receive or send.
Yuma	Email, genealogy research, games, personal web site. Adelphia is unstable; we lose service constantly. AOL always has issues.
Yuma	Email and research; on-line bill paying, fare searching. Long/extended down times.
Yuma	Research, shopping, paying bills, registering travel (plane tickets), price comparing, some help for schooling, check on college grades/assignments. I have a 5 y.o. boy. Sitting and waiting for the net doesn't fit into my schedule well. Quicker is always better when adapting to a schedule with a child. I waste a lot of time waiting for pages to download that could be better spent with my son. Cost is always an issue. Why does high speed access have to be so costly? If the cost were less, it would be more accessible to more families.
Yuma	Mostly for email. I also use it for research of computer information and products. I would like to have a high-speed access to the internet. I am looking now at Adelphia. A combination of cable TV, telephone and internet access for an affordable price is my goal. Many here are on a fixed income and a reasonable rate that would be stable could be attractive. The faster the connection to the internet, the less time wasted. It is simply a matter of time and money.
Yuma	Long distance learning, shopping, read newspaper, email to family and friends.
Yuma	Primarily for email, stock trading, on-line shopping, news and research. (1) Both Adelphia and Qwest try to place outages on the customer's home equipment rather than to admit their server is down or their phone lines have a short, a block from your residence. (2) I do not regard either Adelphia or Qwest as credible service; however, most of the time both services are operational. (3) The customer response to any service call is to have the customer "disconnect home equipment" even when the outage is known and has nothing to do with customer's home equipment.
Yuma	Research for work & family, email, shopping, bill paying, banking, making travel arrangements, medical prescription refills, and software downloads. I use Adelphia broadband. Power link claims speeds of 3 Mbps download and 256 Kbps upload. Those speeds seem to work fine even though shared between up to 2 PCs. When downloading MP3's and uploading emails with digital photos attached, more speed would be cool. Price is a huge factor here. I would not be able to justify more speed unless price was very comparable or other services like phones were included to offset increase.
Yuma	Research, downloads, communication with my students and web design.



Yuma	Email, research, news, current events, news clippings, auctions, price surveys. I would use broadband for all the above checked reasons. Thank you for this opportunity to make my thoughts known.
Yuma	Email, college courses, news, research.
Yuma	Home dial-up access is not good. Even with 56k modem the phone line does not connect at that rate! Very poor connection rate - under 28k. Local facilities need to be upgraded so 56k gets you 56k. At home, I don't need more than that but I need that. People living in Foothills can get almost 56k speed for dialup just because their equipment is newer and better. That is the telephone company equipment and lines. In Yuma, we can't.
Yuma	Research, email, curiosity.
Yuma	Personal home use - non-business.
Yuma	For information (contacts email), selling books, would like to be able to obtain a web site to offer my original art work. I feel that Qwest's charge for line care adds up to "protection" in the Mafia sense. It stinks!! I had a noise problem while living at apartment B of the same address where I live, not at apartment A. Since 1996 living at B, the noise blocked out the conversation at least 50% of the time and continued when I moved to apt A. The first repairman sent in '96 or '97 claimed that it was caused "by the old copper wiring." I requested that it be checked again after moving to apt A. My equipment was the same - the noise continued except when calling company numbers & offices. I had 3 "repairmen" sent, even when I explained that the problem seemed to be at the company switching since it was eliminated when I called them. The 3 men that came, 3 different times, claimed that it was the inside wiring, the wiring used for my computer (I had not been connected at apt B for at least 3 years!) One man claimed & showed me how "my touchtone phone was the cause." He claimed that my dial phone showed fine. I connected the phone that he claimed to be the cause and he continued showing me how the dial phone was OK unaware that he was testing the phone which he claimed to have been causing the noise. Another claimed that the test equipment showed how apt C had the same problem. It never has had a problem. For these lying repairmen's visits, the phone company tried to charge me \$300 which I appealed to the Attorney General and I've been given credit. I learned yesterday that I've been "slammed" and am being charged for 2 long distance programs. I found that I had been getting charged for something I had not requested. I was supposed to have been reimbursed and not sure if it was done completely. Yesterday I noticed and today (11/10/03) seemed to find that I've been "slammed" with an extra long distance bill since last May. Something similar to the previous. What is "Protection" considered? Stealing? I feel that this is a classic example of: You don't "pay protection" they'll get you. They'll make you pay.
Yuma	Communicate with others; email home & work; order - buying personal stuff & gifts; research. I would consider dropping local telephone if cost for cable & internet were lower than it currently is. Meanwhile, I can do time with slower connection at home. Happy with Earthlink and Sprint. See no need to change yet. Adelphia provides good, reliable service - it seems that \$46/month is high for cable. A lower cost option would be nice. Higher speed line would speed up my use and I could do non-computer things.
Yuma	Not computer literate.
Yuma	Have no phone; use library computer for access to internet and contact with my family. Search for and purchase products - banking.
Yuma	Use the internet for email and family and to seek information. The modem and MSN we have now works pretty good. Speed is not the #1 reason or option I would be looking at.
Yuma	Use the library computer for email. I keep in touch with all relatives and friends.

Yuma	Use the library for research, banking, check social security, emails. Very slow computers at public library most days. Time is limited to 1 hour/day and a lot of it is spent waiting for the computer to react to my commands. I get little done because I can only visit the library 1 day/week. More and more, an adequate living standard depends on computer and phone access. Phones are too expensive for me as well as computers. Pay phones are few and far between these days and most have you stand, out in the hot sun, with the noise of traffic so I can't hear.
Yuma	Use the library for job search.

## **APPENDIX D – DATABASES**

## **APPENDIX E – EDUCATION**

- Arizona Cyberschool Legislation
- Qwest and County
- County/Higher Ed Comments
- SACCNet

**ARIZONA "CYBERSCHOOL" LEGISLATION****HB2093 - (NOW: distance learning; technology assisted program): Representative Linda Gray**

Requires pupils enrolled in the Technology Assisted Project Based Instruction Program (TAPBI) to be subject to testing requirements, and students who fail to meet testing requirements may not be able to participate in the Program the following year, unless more than 95% of the pupils have been tested. HB 2093 ensures that pupils in the Program were previously enrolled in a public school in the state, and allows kindergartners who have a sibling already enrolled in the Program to be eligible to participate. Additionally, the bill requires the Superintendent of Public Instruction to evaluate all nationally standardized norm-reference achievement tests offered in kindergarten and grade one, and may make a recommendation for a K-1 test for the Program, which schools may choose to administer. Finally, HB 2093 creates the Joint Select Committee on Technology Assisted Learning, which is repealed December 31, 2003, and adds an Emergency Clause.

05/20 - SIGNED BY GOVERNOR. Chap. 241, 2003 Laws.

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15-808. [Technology assisted project-based instruction program; report](http://www.azleg.state.az.us/ars/15/00808.htm)  
<http://www.azleg.state.az.us/ars/15/00808.htm>

A. A technology assisted project-based instruction program shall be instituted on a pilot basis to meet the needs of pupils in the information age. Until June 30, 2003, the state board of education shall select up to four existing traditional public schools, at least one of which shall serve pupils in kindergarten programs and grades one through twelve, and beginning July 1, 2003, the state board of education shall select seven existing traditional public schools and the state board for charter schools shall select seven charter schools to participate in the program based on the following criteria:

1. The depth and breadth of curriculum choices.
2. The variety of educational methodologies employed by the school and the means of addressing the unique needs and learning styles of targeted pupil populations including computer assisted learning systems, virtual classrooms, virtual laboratories, electronic field trips, electronic mail, virtual tutoring, on-line help desk, group chat sessions and non-computer based activities performed under the direction of a certificated teacher.
3. The availability of an intranet or private network to safeguard pupils against predatory and pornographic elements of the internet.
4. The availability of filtered research access to the internet.
5. The availability of private individual electronic mail between pupils, teachers, administrators and parents in order to protect the confidentiality of pupil records and information.
6. The availability of broadcast quality television production and editing facilities on campus.

7. The availability of faculty members who are experienced in broadcast television production.
8. The availability of faculty members who are experienced with computer networks, the internet and computer animation.
9. The extent to which the school intends to develop partnerships with universities, community colleges and private businesses.
10. The services offered to developmentally disabled populations.
11. The grade levels that will be served by the program.

B. Beginning July 1, 2003, notwithstanding subsection A of this section, any school that was approved to participate before January 1, 2003 is not required to reapply for participation in the program. A pupil is not eligible to participate in the program unless the pupil was previously enrolled in and attended a public school in the previous school year, except that a kindergarten pupil may participate in the program if the pupil has a sibling who is currently enrolled in and attending the program. Pupils who participate in the program are subject to the testing requirements prescribed in chapter 7, article 3 of this title. Upon enrollment, the school shall notify the parents or guardians of the pupil of the state testing requirements. If a pupil fails to comply with the testing requirements and the school administers the tests pursuant to this subsection to less than ninety-five per cent of the pupils in the program, the pupil shall not be allowed to participate in the program.

C. Each school selected by the state board of education to participate in the technology assisted project-based instruction program shall submit an annual report to the state board of education and the joint legislative budget committee. Beginning July 1, 2003, each school selected by the state board for charter schools to participate in the technology assisted project-based instruction program shall submit an annual report to the state board for charter schools and the joint legislative budget committee. The reports shall be submitted by August 1 and shall include the following information:

1. A description of the educational services that are offered under the program and that specifically relate to the depth and breadth of the curriculum choices offered by the school.
2. A description of the effects of media and technology on the delivery of specific educational services to specific pupil populations.
3. A measurement of academic achievement of pupils in the programs, including academic advancement as measured by the increase in grade level equivalent scores each academic year on the nationally standardized norm-referenced achievement test prescribed in section 15-741 and a summary of essential skills test scores, scores on the nationally standardized norm-referenced achievement test, individual pupil portfolios and other assessment tools used by the school. The superintendent of public instruction shall evaluate current nationally standardized norm-referenced achievement tests offered to pupils in kindergarten and grade one. The evaluation shall include the impact on the pupils, the costs associated with each test and the academic value associated with each test. The superintendent of public instruction may recommend at least one nationally standardized norm-referenced achievement test for schools participating in the program

pursuant to this section to be offered to pupils. Each participating school may offer this test to its pupils and if the test is offered, each participating school shall be responsible for the costs of administering the standardized norm-referenced achievement test to pupils in kindergarten programs and grade one. Each participating school shall analyze the results of the standardized norm-referenced achievement tests administered to pupils in kindergarten programs and grade one.

4. Academic advancement as measured in grade level equivalents each academic year based on a standardized norm-referenced achievement test.

5. The results of a survey of pupil satisfaction with the program, including:

- (a) Pupils' attitudes about delivery modalities employed by the school.
- (b) Changes in pupils' attitudes toward learning in general.
- (c) Changes in pupils' attitudes about their own ability to learn and about their own academic progress.
- (d) Pupils' attitudes about the school they attend.

6. The results of a survey of parental satisfaction with the program, including:

- (a) Parents' and their children's attitudes about the delivery modalities employed by the school.
- (b) Changes in their children's attitudes about learning in general.
- (c) Changes in their children's attitudes about their ability to learn and about their academic progress.
- (d) Parents' and their children's attitudes about the school that the child attends.

7. A description of the availability and equitable distribution of educational services provided under the program including specific descriptions of the effectiveness of technology tools and modalities used to address the needs of any underserved populations targeted by the school.

8. A description of the operational and administrative efficiency of the program.

9. A description of the cost-effectiveness of the program.

D. The state board of education and joint legislative budget committee shall collaboratively compile and evaluate the information submitted in the annual reports by schools participating in the pilot program, pursuant to subsection C of this section. The state board of education and the joint legislative budget committee shall report their findings to the governor, the speaker of the House of Representatives and the president of the senate by November 15 of each year.

E. Each school selected for the technology assisted project-based instruction program shall ensure that a daily log is maintained for each pupil who participates in the program. The daily log shall describe the amount of time spent by each pupil participating in the program pursuant to this section on academic tasks. The daily log shall be used by the school district or charter school to qualify the pupils who participate in the program in the school's average daily attendance calculations pursuant to section 15-901.

F. If a pupil is enrolled in a school district or charter school and also participates in the technology assisted project-based instruction program, the sum of the average daily membership, which includes enrollment as prescribed in section 15-901, subsection A, paragraph 2, subdivisions (a) and (b) and daily attendance as prescribed in section 15-901,



subsection A, paragraph 6, for that pupil in the school district or charter school and in the technology assisted project-based instruction program shall not exceed 1.0. If the pupil is enrolled in a school district or a charter school and also participates in the technology assisted project-based instruction program and the sum of the daily membership or daily attendance for that pupil is greater than 1.0, the sum shall be reduced to 1.0 and shall be apportioned between the school district or charter school and the technology assisted project-based instruction program based on the percentage of total time that the pupil is enrolled or in attendance in the school district or charter school and the technology assisted project-based instruction program. The uniform system of financial records shall include guidelines for the apportionment of the pupil enrollment and attendance as provided in this subsection.

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House of Representatives

HB 2093

technology assisted pilot program; repeal

<http://www.azleg.state.az.us/FormatDocument.asp?inDoc=/legtext/46leg/1r/summary/h%2Ehb2093%5F05%2D22%2D03%5Fastransmittedtogovernor%2Edoc%2Ehtm&DocType=S>

(NOW: distance learning; technology assisted program)

Sponsor: Representative Gray L

HB 2093 requires pupils enrolled in the Technology Assisted Project Based Instruction Program (TAPBI) to be subject to testing requirements, and students who fail to meet testing requirements may not be able to participate in the Program the following year, unless more than 95% of the pupils have been tested. HB 2093 ensures that pupils in the Program were previously enrolled in a public school in the state, and allows kindergartners who have a sibling already enrolled in the Program to be eligible to participate. Additionally, the bill requires the Superintendent of Public Instruction to evaluate all nationally standardized norm-reference achievement tests offered in kindergarten and grade one, and may make a recommendation for a K-1 test for the Program, which schools may choose to administer. Finally, HB 2093 creates the Joint Select Committee on Technology Assisted Learning, which is repealed December 31, 2003, and adds an Emergency Clause.

#### History

The TAPBI Program was established by Laws 1998, Chapter 224. Two school districts and two charter schools participate in the TAPBI Program: Deer Valley Unified, Mesa Unified, PPEP TEC Charter School and Sequoia Choice Charter School.

A.R.S Section 15-808 requires each school selected to participate in the TAPBI Program to submit an annual report to the State Board of Education (SBE) and the Joint Legislative Budget Committee (JLBC) by June 30 that includes the following information:

- A description of the educational services that are offered under the Program.
- A description of the effects of media and technology on the delivery of specific educational services to specific pupil populations.
- A measurement of academic achievement of pupils in the programs.

- Academic advancement as measured in grade level equivalents each academic year based on a standardized norm-referenced achievement test.
- The results of a pupil satisfaction survey.
- The results of a parental satisfaction survey.
- A description of the availability and equitable distribution of educational services provided.
- A description of the operational and administrative efficiency of the Program.
- A description of the cost-effectiveness.

A 2002 study conducted by the SBE and the JLBC found that TAPBI Program sites were not reporting standardized test scores data for program participants as stipulated in statute. It was found that this was due to the fact many students only participate in TAPBI courses for one year, so year-to-year academic progress was not measurable. Further, most TAPBI students are enrolled in both TAPBI and non-TAPBI courses in the same year, therefore their annual academic progress, as determined for TAPBI courses only, could not be determined. Current law limits the number of participating students within the state to 500.

#### Provisions

- Requires the SBE to select seven traditional public schools to participate in the Program.
- States that the State Board for Charter Schools must select seven charter schools to participate in the Program.
- States that any school that was approved to participate in the Program before July 1, 2003 is not required to reapply.
- Stipulates that pupils who participate in the TAPBI Program are subject to current statutory testing requirements and if the requirements are not met the pupil will be prohibited from participating in the TAPBI Program, unless 95% of pupils in the program meet the testing requirements.
- Ensures that pupils in the Program were previously enrolled in a public school in the state.
- Allows kindergartners who have a sibling already enrolled in the Program to be eligible to participate.
- Specifies that upon a pupil's enrollment the school must inform the parent or guardian of the state testing requirements.
- Stipulates that by August 1 each school selected by the State Board for Charter Schools to participate in the Program must submit an annual report to the State Board for Charter Schools and Joint Legislative Budget Committee.

- Changes the date from June 30 to August 1 by which schools that participate in the TAPBI Program must submit an annual report to the Legislature.
- Requires the Superintendent of Public Instruction to evaluate all nationally standardized norm-reference achievement tests offered in kindergarten and grade one, and may make a recommendation for a K-1 test for the Program, which schools may choose to administer. Each school that chooses to administer the K-1 test is responsible for all costs.
- Creates the 11-member Joint Select Committee on Technology Assisted Learning responsible for:
  - Identifying the best practices to technology assisted learning programs throughout the United States.
  - Preparing a cost analysis of similar programs throughout the United States.
  - Studying the feasibility of the expansion of technology assisted learning programs in this state.
  - Presenting a report on the Committee's findings and recommendations to the Legislature.
- Repeals that Committee after December 31, 2003.
- Contains an emergency clause.

· ----- DOCUMENT FOOTER -----

· 46th Legislature

· First Regular Session      3      May 22, 2003

· ----- DOCUMENT FOOTER -----

## QWEST CAPABILITIES OFFERED TO THE COUNTY CUSTOMERS

- **Network Consulting:** Qwest provides the networking expertise of engineering personnel to design, implement and maintain the schools complex networks. These consultants can help schools challenging network issues such as network architecture, performance optimization, traffic analysis, and security concerns.
- **Design and Architecture**  
This service aids the County schools with the design and planning of a new network or the revision of an existing network. QWEST System Engineers can help provide efficient network designs, strategic recommendations, and long-range plans to meet the County school's technical and communication requirements.
- **Project Management:** For the coordination of large or complex networking projects, Qwest provides project management services. These services enable the County schools to concentrate on larger issues while QWEST handles the details of project implementation. Project management support ensures the smooth and timely completion of your key projects.
- **Project Implementation**  
Qwest will provide staff to implement school requirement to correct deficiencies or improve the Information Technology infrastructure of all schools throughout Arizona. Including the expansion of broadband services to connect to the internet.
- **Equipment Acquisition**  
Some County projects require Qwest personnel to coordinate the ordering and acquisition of equipment, telephone circuits or other materials. This may include developing project specifications, determining quantities, placing orders, and arranging for delivery and installation. Project Management service assure adherence to the equipment requirements.
- **Staging/Deployment/Transition Planning**  
Using proven project management techniques, Qwest personnel will prepare school projects for smooth deployment. This will help to ensure that required equipment and technical staff are ready to proceed at the appropriate milestones. Additionally, to help ensure a trouble-free transition, Project Management staff can develop plans to accommodate the individual requirements of effected personnel.
- **Status and Progress Reporting**  
Qwest will ensure that school's project managers are kept up-to-date on the progress of the project. In this way, the project can move forward smoothly while keeping surprises and problems to a minimum. As required, this may include regular status meetings, emails, status reports, charts/graphs, and/or conference calls.
- **Contingency Planning/Problem Resolution**  
In large and complex projects, unanticipated issues may arise. If requested, Qwest can develop backup options and contingencies plans. By taking this extra step, disruptions can be avoided, downtime minimized and frustrations reduced.
- **Infrastructure Management**  
Qwest provides experienced personnel to consult on the management of existing networks and assure installation of new networks. This service provides an effective manner in which to handle the ongoing operation of large and complex networks.
- **Network Security Issues**  
Network security has become a critical concern for most schools. Arizona schools

now rely heavily on their networks as a communication mechanism, a repository for important documents, and a major source of educational material. As a result, threats from hackers, viruses, and catastrophic mishaps can unexpectedly damage a business' ability to operate. QWEST personnel can help schools enhance their networks with security appraisals and security programs.

- **Problem Diagnosis and Resolution**

Networks develop problems. Whether because of hardware or software failures, capacity issues, or new applications—problems are inevitable. However, if network problems develop, Qwest personnel are available to help determine the cause of the problems, resolve them, and quickly have a school district's network operational again. In addition to resolving problems, System Engineers can make recommendations that will improve the performance of networks.

- **Performance Optimization**

Most networks work well when originally designed and installed. However, network speed and functionality may degrade when, for example, additional people are added to the network, internet access is provided, email systems are installed, or voice response systems are developed. To help schools assess the operation and improve the performance of their networks, System Engineers can review traffic volumes, determine bottlenecks, appraise segmentation patterns, and review the functionality of existing equipment.

- **Traffic Analysis and Auditing Services**

A performance baseline and product inventory are important tools that can be used to evaluate the current and future performance of a network. After gathering traffic data and inventorying key communication links, Qwest's technical staff can evaluate the information and provide recommendations for network tuning or modifications. Often, the results of a traffic analysis or network audit can uncover bottlenecks, network design flaws, or outmoded technology. Further, the data gathered might be used as the basis for recommendations that can improve the capabilities and performance of a school's network.

- **Network Management System Design**

Keeping a network running smoothly can be facilitated with network management systems. Such systems can monitor key network functions, anticipate problems, and better plan for future expansions. System Engineer consultants can work with schools to design and implement a management system that provides a high level of functionality and enhances network operations.

## COUNTY/HIGHER ED COMMENTS

Internet is currently used for both educational and administrative purposes for running the Gadsden Elementary School District #32. The internet use for email and communications by students and staff is increasing at a fantastic rate. Within 2 years over 2,000 users a day will be accessing the internet through our network. We would currently like to see a little more competition for high speed internet in the San Luis area. We currently would like a DS-3 or better connection to the internet to provide for our growing needs. We are working with both Qwest Communications and Adelphia Communications to provide connectivity both to the internet and our sites. Adelphia is currently leasing us fiber to connect all of our schools and Gig E speeds. We are hopeful that they will be able to provide a high speed internet connection at DS-3 or better speeds in the near future. The local Adelphia office has been very responsive to our specific needs and we look forward to working with them in the future. Qwest has also been responsive to our needs; however they are a bit pricey compared to some other services we have looked at, and their lack of improved services could have us looking for a new provider in the near future.  
*Gadsden Elementary School District #32*

Email, terminal services, web access and data transfer.  
*Western Arizona Area Health Education Center, Inc.*

For educational purposes including reference and research and for administrative purposes such as State and Federal reporting. We also run the following servers: Web, Email, File Sharing, Student Information System (SIS) and we access our financial system which is an Application Service Provider (ASP) through the internet. We use Frame Relay T-1 for voice and data between all of our schools and to our voice and internet service providers. We have very few problems with these circuits and when we do, vendors are quick to get them fixed. Our biggest issue is trying to get our enhanced 911 service approved. I'm referring to the Private Switch/Automatic Location Identification (PS/ALI) service that allows 911 to work correctly on our phone system. Because our 4 locations are connected centrally by T-1 lines, a 911 call from any of our 4 schools shows as being from the district office. PS/ALI corrects this, but our agreement must be approved by the Yuma Metropolitan planning Organization (YMPO) Board which we have been trying to do for almost a year now. In reference to getting this approval, we were told, "This is no big deal - it just takes approval." That was last January and we are still waiting. In the meantime, a delay in emergency response caused by this problem could cause a very dangerous and even fatal situation.  
*Somerton School District*

For student research and filing reports with the Department of Education.  
*Antelope Union High School District #50*

# Southern Arizona Communication Consortium Network (SACCNNet)

## **Graham County Board of Supervisors**

**Jim Palmer (Chairman)**

**Mark Herrington**

**Drew John**

## **County Manager**

**Terry Cooper**

## **Information Technology Director**

**John C. Lucas**





**What is it all about!**

- Connecting Southern Arizona Counties to Phx/State of Arizona through County Supervisors Association (C.S.A.)
  - Cochise
  - Gila
  - Graham
  - Greenlee
  - Pima
  - Pinal
  - Santa Cruz

**How is it to be done?**

- Use of Leased Telco Provided Fiber Lines
- Muxing Technology converting Fiber to multiple 1Gib Channels
  - Creation of (12) 1Gig Channels from (3) Stands of Fiber
- Daisy Chaining of Fiber between County Seats and CSA
- Redundant Microwave Link from Graham County to CSA(Phx)

**We Propose That The (12) 1Gig Channels Be Utilized as Follows:**

- (7) County/State Services Link
- (1) Justice Network (Arizona Office of the Courts/DPS)
- (1) Communication Net
- Emergency Services /Homeland Defense
- Video Conferencing (i.e. Town Halls from Phoenix.)
- County-County Video Conferencing (example: distance learning labs, telemedicine, etc.)
- Intranet between agencies
- State-Wide Fund Accounting System
- (1) State/State Link (ADOT, ADOC, DMV, DES, etc)
- (1) Federal Link (Federal Agencies)
- (1) Community Net (Internet, Education, Open forum)

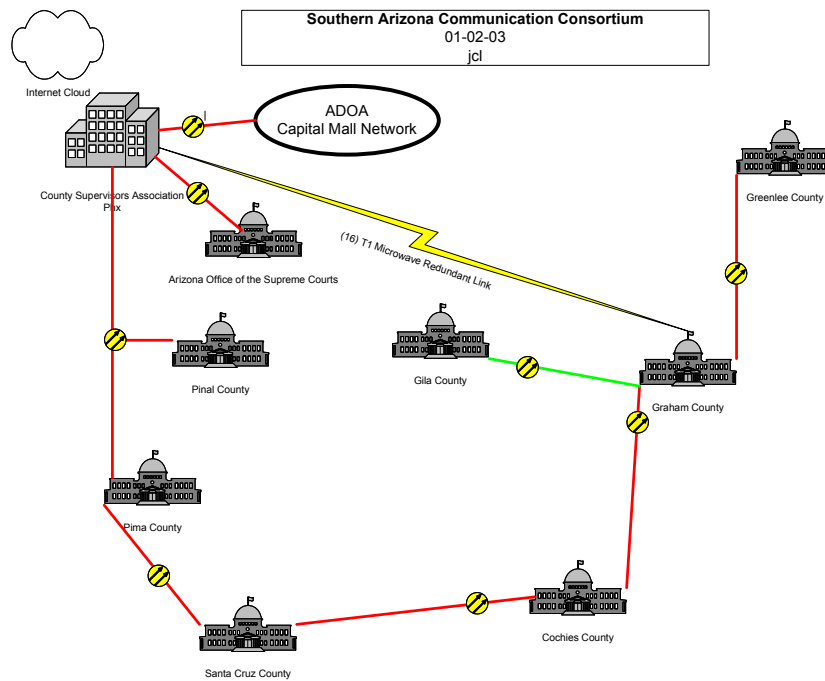
**Why Connect?**

- High Speed Arizona Government
- Cost Savings over T-1 Telco Solutions (over 75% annually)
- County to County Connectivity
- State to County Connectivity
- Shared resources
  - Internet (High Speed Link)
  - Application Suite Libraries
  - Video Conferencing
    - Each County seat will have a video lab for training and emergency services. The lab scheduling will be maintained by CSA.
  - Combined Accounting Suite
- Secure environment
- Emergency Management/Homeland defense
- Release Telco Resources To Community
- Statewide Education Platform

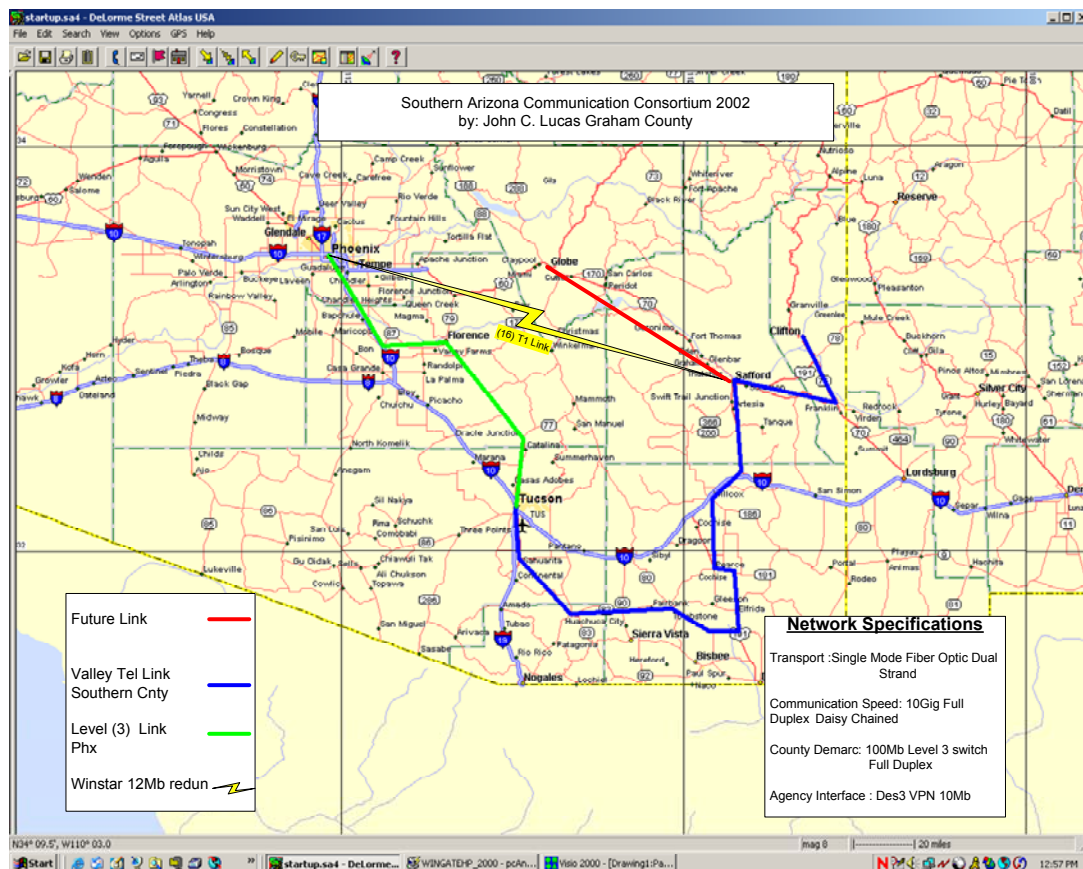
**Overall Project Concept**

- Purchase Fiber Strands (NRC) (20 Yr Lease)
- Yearly Maintenance Fee
- Co-locate in Valley Tel Facility
- Primary Demark at each County Seat or best location.
- Switched Backbone, all secure traffic Triple DES encryption
- (12) 1Gig Channels on Single Mode Fiber w/redundant microwave link
- Administered by CSA (County Supervisors Association)

# SACCN Net Communication Loop



# SACCNNet Fiber Path





## **APPENDIX F – TELEMEDICINE**



### **Arizona Telemedicine Program Network of Networks**

**January, 2004**



## Arizona Sites

### Arizona Telemedicine Program Hospital/Clinic Sites

#### Arizona

							Video	Data
1	ADHS-CRS	150 N. 18th Ave.	Phoenix	AZ	85017	Maricopa	X	
2	Cobre Valley Community Hospital	5880 South Hospital Drive	Globe	AZ	85501	Gila		X
3	Desert Vista Behavioral Health Center	570 W. Brown	Mesa	AZ	85201	Maricopa	X	X
4	Flagstaff Medical Center (ADHS-CRS & NACP)	1200 N. Beaver St.	Flagstaff	AZ	86001	Coconino	X	X
5	Good Samaritan Regional Medical Ctr	1111 E. McDowell Road	Phoenix	AZ	85006	Maricopa	X	X
6	Hopi Healthcare Center	Milepost 388, Highway 264	Polacca	AZ	86042	Navajo	X	X
7	Kino Community Hospital	2800 E. Ajo Way	Tucson	AZ	85713	Pima		X
8	Maricopa Medical Center	2601 E. Roosevelt	Phoenix	AZ	85016	Maricopa	X	X
9	Mariposa Community Health Center	1852 N. Mastick Way	Nogales	AZ	85621	Santa Cruz	X	X
10	Mountain Park Health Center	635 E. Baseline Road	Phoenix	AZ	85040	Maricopa		X
11	NAIHS Chinle	P.O. Box Drawer PH	Chinle	AZ	86503	Apache	X	X
12	NAIHS Ft. Defiance	P.O. Box 649	Ft. Defiance	AZ	86504	Apache	X	X
13	NAIHS Inscription House	P.O. Box 7397	Tonalea	AZ	86044	Coconino	X	X
14	NAIHS Kayenta Service Unit	P.O. Box 368	Kayenta	AZ	86033	Navajo	X	X
15	NAIHS Tsaile	P.O. Box 467	Tsaile	AZ	86557	Apache	X	X
16	NAIHS Winslow Health Center	P.O. Drawer 40	Winslow	AZ	86047	Navajo	X	X
17	PAIHS Ak Chin Clinic	45203 W. Farrel Rd.	Maricopa	AZ	85238	Pinal		X
18	PAIHS Cibecue Health Center		Cibecue	AZ		Navajo		X
19	PAIHS Desert Visions Reg. Treatmnt Ctr.	198 S. Skill Center Rd.	Sacaton	AZ	85247	Pinal	X	X
20	PAIHS Eastern Arizona District Office	P.O. Box 2430	Pinetop	AZ	85935	Navajo		X
21	PAIHS Gila Crossing Health Center	P.O. Box 380	Laveen	AZ	85339	Maricopa		X
22	PAIHS HuHuKam Memorial Hospital	P.O. Box 38	Sacaton	AZ	85247	Pinal		X
23	PAIHS OEH West. AZ District Office	10631 S. 51 <sup>st</sup> St. #2	Phoenix	AZ	85044	Maricopa		X
24	PAIHS Phoenix Area Office	40 N. Central Ave. #605	Phoenix	AZ	85004	Maricopa		X
25	PAIHS Parker	Rt. 1, Box 12	Parker	AZ	85344	La Paz	X	X
26	PAIHS Peach Springs	P.O. Box 190	Peach Springs	AZ	86434	Mohave		X
27	PAIHS Phoenix Indian Medical Ctr	4212 N. 16th Street	Phoenix	AZ	85016	Maricopa	X	X
28	PAIHS Salt River Health Center	10005 E. Osborn Rd.	Scottsdale	AZ	85256	Maricopa		X
29	PAIHS San Carlos	P.O. Box 208	San Carlos	AZ	85550	Gila	X	X
30	PAIHS Whiteriver Service Unit	State Rte 73, Milepost 342	Whiteriver	AZ	85941	Navajo	X	X
31	Payson Regional Medical Center	807 Ponderosa	Payson	AZ	85541	Gila	X	X
32	Sage Memorial Hospital	PO Box 457, Route 264	Ganado	AZ	86505	Apache	X	X
33	Scottsdale Healthcare	9003 E. Shea Boulevard	Scottsdale	AZ	85260	Maricopa	X	
34	Southeast Arizona Medical Center	2174 Oak Ave	Douglas	AZ	85607	Cochise	X	X
35	Southwest PET Institute	3503 N. Campbell Ave.	Tucson	AZ	85719	Pima		X
36	St Elizabeth of Hungary Clinic	140 W. Speedway Blvd.	Tucson	AZ	85705	Pima	X	X
37	St. Joseph's Hosp. & Med. Ctr ADHS-CRS	350 W. Thomas Rd.	Phoenix	AZ	85013	Maricopa	X	
38	St. Luke's Medical Center	1800 E. Van Buren St.	Phoenix	AZ	85006	Maricopa		X
39	St Mary's Hospital	1601 W. St. Mary's Rd.	Tucson	AZ	85745	Pima	X	X
40	Tuba City Regional Health Care Corp	167 N. Main Sreet	Tuba City	AZ	86045	Coconino	X	X
41	Tucson Heart Hospital	4888 N. Stone Ave.	Tucson	AZ	85704	Pima		X
42	Tucson Med. Ctr - Square & Compass ADHS-CRS	2600 N. Wyatt Dr.	Tucson	AZ	85712	Pima	X	
43	University Medical Center	1501 N. Campbell Avenue,	Tucson	AZ	85724	Pima	X	X
44	Verde Valley Medical Center	269 S. Candy Lane	Cottonwood	AZ	86326	Yavapai	X	X
45	White Mountain Regional Medical Ctr	118 S. Mountain Avenue	Springerville	AZ	85938	Apache	X	X
46	Yuma Regional Med. Center ADHS-CRS	2400 Avenue A	Yuma	AZ	85364	Yuma	X	

**ADHS CRS** – Arizona Department of Health Services Children's Rehabilitative Services      **NACP** – Native American Cardiology Program

**NAIHS** – Navajo Area Indian Health Service      **PAIHS** – Phoenix Area Indian Health Service

The **Arizona Telemedicine Program Network** is a secure private network comprised of dedicated T3 and T-1 telecommunications lines. All sites are connected via dedicated T-1 circuit to the Arizona Telemedicine Program Network. (Exceptions: Verde Valley Medical Center is connected via the Northern Arizona Healthcare WAN to Flagstaff Medical Center, Cobre Valley Community Hospital is connected via Internet/VPN, Mt. Graham Regional Medical Center participates as a TeleHome Healthcare Hub.) Circuits to NAIHS Ft. Defiance, NAIHS Winslow Health Center, Tuba City Indian Medical Center, and to the PAIHS Las Vegas, NV Switch are T3.

**Dial-up Videoconferencing.** The Arizona Telemedicine Program Network has a dial-up videoconference capability to reach other hospitals and healthcare organizations with this capability, e.g., the Shriners Intermountain Hospital in Salt Lake City uses this capability to conduct regular telemedicine clinics with patients in Tucson.



## Behavioral Health Clinical Sites

The following sites comprise the **Arizona TeleBehavioral Health Network** and can be linked by video to any video sites on the **Arizona Telemedicine Program** network through an interconnection between the two networks at the Northern Arizona Behavioral Health Authority (NARBHA) administrative office in Flagstaff.

							Video	Data
	<b>NARBHA</b>							
1	NARBHA	1300 S. Yale Street	Flagstaff	AZ	86004	Coconino	X	
2	Community Behavioral Health Svcs	32 N. 10 <sup>th</sup> Ave., #1,2	Page	AZ	86040	Coconino	X	
3	Community Counseling Centers	211 E. Third Street	Winslow	AZ	86047	Navajo	X	
4	Community Counseling Centers	105 North Fifth Avenue	Holbrook	AZ	86025	Navajo	X	
5	Community Counseling Centers	2550 Show Low Lake Rd	Show Low	AZ	85901	Navajo	X	
6	Little Colorado Behav. Health Ctrs	470 W. Cleveland	St. Johns	AZ	85936	Apache	X	
7	Little Colorado Behav. Health Ctrs	50 North Hopi	Springerville	AZ	85936	Apache	X	
8	Mohave Mental Health Clinics	1743 Sycamore Ave.	Kingman	AZ	86401	Mohave	X	
9	Mohave Mental Health Clinics	2187 Swanson	Lake Havasu City	AZ	86403	Mohave	X	
10	Mohave Mental Health Clinics	1145 Marina Blvd.	Bullhead City	AZ	86442	Mohave	X	
11	Verde Valley Guidance Clinic	600 S. Willard Street	Cottonwood	AZ	86326	Yavapai	X	
12	West Yavapai Guidance Clinic	642 Dameron Drive	Prescott	AZ	86301	Yavapai	X	
13	Ariz. Council of Human Service Providers	2100 N. Central Avenue	Phoenix	AZ	85004	Maricopa	X	
14	Arizona State Hospital (ASH)	2500 E. Van Buren	Phoenix	AZ	85008	Maricopa	X	
							Video	Data
	<b>EXCEL</b>							
15	Excel Family & Adult Services	3220 E. 40th Street	Yuma	AZ	85365	Yuma	X	
16	Excel Child Services	2501 Arizona Avenue	Yuma	AZ	85364	Yuma	X	
17	Excel San Carlos	106 E. 1 <sup>st</sup> Street	Yuma	AZ	85364	Yuma	X	
18	La Paz County Behavioral Health Svcs	1021 Kofa Avenue	Parker	AZ	85344	La Paz	X	
19	Excel Group Quartzite	730 West Cowell	Quartzite	AZ	85346	LaPaz	X	
20	San Luis Behavioral Health Services	679 N. 1 <sup>st</sup> St., Suite E	San Luis	AZ	85349	Yuma	X	
21	Excel Group East County	28671 Los Angeles Ave.	Wellton	AZ	85356	Yuma	X	
							Video	Data
	<b>PGBHA</b>							
22	PGBHA	2066 W. Apache Trail, Ste 116	Apache Junction	AZ	85220	Pinal	X	
23	Superstition Mt Mental Health Ctr	150 Ocotillo, Bldg 2	Apache Junction	AZ	85220	Pinal	X	
24	San Pedro Valley Behavioral Health	100 Tilbury Drive	Kearny	AZ	85237	Pinal	X	
25	Horizon Human Services	120 W. Main	Casa Grande	AZ	85222	Pinal	X	
26	Horizon Human Services	478 Hagen Hill	Globe	AZ	85539	Gila	X	
27	Pinal Hispanic Council	712 N. Main St.	Eloy	AZ	85231	Pinal	X	
28	Rim Guidance Center	404 W. Aero Drive	Payson	AZ	85541	Gila	X	
29	San Pedro Valley Behavioral Health	900 Mt. Lemmon Rd.	Oracle	AZ	85623	Pinal	X	
							Video	Data
	<b>CPSA</b>							
30	Community Partnership of So. Arizona	4575 E. Broadway	Tucson	AZ	85711	Pima	X	
31	CPSA Training Center	2502 N. Dodge	Tucson	AZ	85716	Pima	X	
32	Casa de Esperanza	780 S. Park Centre Ave.	Green Valley	AZ	85614	Pima	X	
33	CODAC	3100 N. 1 <sup>st</sup> Ave.	Tucson	AZ	85719	Pima	X	
34	COPE Behavioral Services, Inc.	101 S. Stone	Tucson	AZ	85701	Pima	X	
35	La Frontera	502 W. 29 <sup>th</sup> St.	Tucson	AZ	85713	Pima	X	
36	Marana Health Clinic	13644 N. Sandario Rd.	Marana	AZ	85653	Pima	X	
37	Providence of Arizona, Inc.	620 N. Craycroft	Tucson	AZ	85711	Pima	X	
38	Pantano Behavioral Health Services	5055 E. Broadway, C-104	Tucson	AZ	85711	Pima	X	
39	CPSA-Sierra Vista	999 E. Fry Blvd., Ste 109	Sierra Vista	AZ	85635	Cochise	X	
40	SEABHS-Sierra Vista	185 S. Moorman	Sierra Vista	AZ	85635	Cochise	X	
41	SEABHS-Benson	590 S. Ocotillo Ave.	Benson	AZ	85602	Cochise	X	
42	Southeastern AZ Psych Health Facility	470 S. Ocotillo Ave.	Benson	AZ	85602	Cochise	X	
43	SEABHS-Nogales	32 Blvd del Rey David	Nogales	AZ	85621	Santa Cruz	X	
44	SEABHS-Douglas	1701 N. Douglas Avenue	Douglas	AZ	85607	Cochise	X	
45	SEABHS-Safford	680 Eighth Street	Safford	AZ	85546	Graham	X	
46	SEABHS-Bisbee	214 Bisbee Rd.	Bisbee	AZ	85603	Cochise	X	
47	ADHS-Div. of Behavioral Health Services	150 N. 18 <sup>th</sup> Ave., Suite 200	Phoenix	AZ	85007	Maricopa	X	

**NARBHA**-Northern Arizona Behavioral Health Authority

**PGBHA**-Pinal Gila Behavioral Health Authority

**EXCEL**-The Excel Group

**CPSA**-Community Partnership of Southern Arizona



## Arizona Correctional Telemedicine Sites

The **Arizona Telemedicine Program** Network provides network connections to 10 Arizona Department of Corrections sites:

							Video	Data
	<b>AZ Dept. of Corrections</b>							
1	AZ DOC Director's Office		Phoenix	AZ		Maricopa	X	X
2	AZ DOC Inmate Health Services Central Office	2005 N. Central Avenue	Phoenix	AZ	85004	Maricopa	X	X
3	ASPC Douglas	PO Drawer 3867	Douglas	AZ	85608	Cochise	X	X
4	ASPC Eyeman	SMUII, PO Box 695, 4374 e. Butte	Florence	AZ	85732	Pinal	X	X
5	ASPC Florence	P.O. Box 3867	Florence	AZ	85732	Pinal	X	X
6	ASPC Lewis	26700 S. Hwy 85, PO Box 70	Buckeye	AZ	85326	Maricopa	X	X
7	ASPC Perryville	PO Box 3000	Goodyear	AZ	85336	Maricopa	X	X
8	ASPC Safford	896 S. Cook Road	Safford	AZ	85548	Graham	X	X
9	ASPC Tucson	10000 S. Wilmot Rd.	Tucson	AZ	85734	Pima	X	X
10	ASPC Yuma	7125 E. Juan Sanchez Blvd.	San Luis	AZ	85349	Yuma	X	X

Maricopa Correctional Health Services will be connecting 10 Maricopa County Jails during 2003-04.  
Pima County Institutional Health will be connecting 3 county detention facilities in 2003.



## Health Sciences Education and Research Sites

**Arizona Telemedicine Program** connects to additional health sciences education and research sites:

							Video	Data
	<b>Education/Research</b>							
1	UA AHSC Phoenix Programs	4001 N. 3 <sup>rd</sup> Street, Suite 415	Phoenix	AZ	85012	Maricopa	X	X
2	NAU College of Health Professions	Col of Health Prof Room 229	Flagstaff	AZ	86011	Coconino	X	
3	Native American Cancer Research Partnership - UA	1527 E. Mabel Street	Tucson	AZ	85721	Pima	X	
4	Native American Cancer Research Partnership - NAU	Bldg 3	Flagstaff	AZ	86011	Coconino	X	

Pediatricians in Yuma want telecardiology



## Western Region Hospital/Clinic Sites

### Nevada

							Video	Data
1	PAIHS Reno/Sparks	34 Reservation Rd.	Reno	NV	89502	Washoe		X
2	PAIHS Southern Bands Health Center	515 Shoshone Circle	Elko	NV	89801	Elko		X

### New Mexico

							Video	Data
1	NAIHS Crownpoint Hospital		Crownpoint	NM	87313	McKinley	X	X
2	NAIHS Gallup Indian Medical Center	P.O. Box 1137	Gallup	NM	87301	McKinley		X
3	NAIHS Northern Navajo Medical Ctr	P.O. Box 160	Shiprock	NM	87420	San Juan	X	X
4	NAIHS Tohatchi Health Center		Tohatchi	NM	87325	McKinley		X

### Utah

							Video	Data
1	PAIHS Ft. Duchesne	P.O. Box 160	Ft. Duchesne	UT	84026	Uintah		X
2	Intermountain Shriners Hospital	Fairfax Rd. at Virginia St.	Salt Lake City	UT	84103		ISDN	



## International Sites



### Panama

	Institution	City	District	Specialties
1	Royal Center	Panama City	Panama	General
2	Hospitalario Metropolitano de la Caja de Seguro Social	Panama City	Panama	General, Pathology, Radiology
3	Hospital Oncologico (Gorgas)	Panama City	Panama	Pathology, Radiology
4	Caja de Seguro Social Policlínica	Las Tablas	Los Santos	Radiology
5	El Vigia Hospital	Chitre	Herrera	Pathology
6	Caja de Seguro Social	Changuinola	Bocas del Toro	General, Radiology

All connections within Panama are currently PSTN (Public Service Telephone Network). Connectivity to the U.S. is via the internet. E1/T-1 circuits are planned within Panama and to the U.S. in 2003-04.

## **APPENDIX G – WIRELESS**

## Freedom to connect

### Wireless Internet access is popping up in unexpected places

**By Roger Fillion, Rocky Mountain News  
January 19, 2004**

When he rolls into a truck stop, trucker Terry Feldman sometimes bunks down in his cab for a two-hour nap, depending on the time of day. He also might head inside to grab a cheeseburger or a shower.

Recently, Feldman added a new routine to some of his stops: He pops open his laptop computer and logs on to the internet - wirelessly and from the comforts of his truck, thanks to a technology initially popular at trendy coffee hangouts and hotels.

The Colorado Springs resident, who drives for Commerce City- based Navajo Express, zaps e-mails to family and friends. He checks weather and road conditions online, especially in the winter when treacherous conditions can cause road closures. He retrieves maps.

Feldman also might investigate something he's seen splashed on a roadside billboard - like the time he logged on to the Web site of a dental health plan he saw advertised in Bethlehem, Pa.

"I'll just pull into the lot, pull out the computer, and away you go," said Feldman, who pays \$1.95 an hour for a service deployed at 145 Flying J travel plazas around the nation, including Colorado. "It's a lot better than having to look for a phone jack inside."

To get online, Feldman uses a high-speed wireless internet access system typically associated with the likes of Marriott hotels or Starbucks coffee shops.

Wireless-fidelity, or Wi-Fi, is surfacing in more mainstream public establishments, as Feldman's experience shows.

"I suspect we'll see more interesting places like the truck stops and RV parks coming out," said Phillip Redman, an analyst with researcher Gartner Inc.

Indeed.

Wi-Fi "hot spots" are popping up in other, less conventional public venues: marinas, barbershops, beauty parlors, public libraries, train stations and coin laundries. Selected McDonald's restaurants are rolling out Wi-Fi access in cities such as New York, Chicago, Seattle and San Francisco.

Some places may end up drawing few Web surfers. Still, such venues appear willing to bet Wi-Fi will attract tech junkies who otherwise wouldn't stroll inside.

"Offering it as a utility helps attract customers. As long as it can be rolled out cost-effectively, that can help a business," said Ross Rubin, senior analyst with New York researcher eMarketer.



## **Explosive growth**

Wi-Fi is a radio signal that beams internet connections 300 feet or more. It gives on-the-go Web surfers a speedy, un-tethered link to the internet.

Wi-Fi is 100 times faster than an ordinary phone line. The speed at which users ultimately get online depends on the broadband connection - DSL or cable, for example - that ties the Wi-Fi network into the internet.

Users can log on using a laptop computer or a handheld personal digital assistant.

The technology is experiencing explosive growth and use.

According to Gartner's research, the number of public Wi-Fi hot spots in North America is expected to surge to 50,811 this year from 28,680 in 2003. The number is expected to hit 53,479 by 2008.

A recent convert is the Dakota Ridge RV Park in Golden, nestled at the base of the Front Range foothills.

Built in 1992 on a former wheat field, the park offers motor-home and trailer enthusiasts more than 140 paved sites. Picnic tables dot the grounds. Satellite-TV dishes sit atop the RVs.

A new object recently sprouted from the top of the Dakota Ridge offices: a roughly 8-foot-tall Wi-Fi antenna.

The Wi-Fi network was installed last November. It can reach residents throughout the 5-acre park. And it augments the ordinary phone lines that residents previously relied on to get online.

That's been great for Sylvi Braathen, a life coach who speaks to clients in Norway and Sweden from a home office in her motor home. The sessions last 30 to 45 minutes.

Before Wi-Fi's arrival at Dakota Ridge, Braathen used the Dakota Ridge phone system to talk with her clients.

"The phone had a tendency to cut out. It wasn't a very good line," she recalled.

What's more, her clients would sometimes have to dial different numbers to get in touch with her, given the nature of the RV park's phone system.

## **'Thirsty for Wi-Fi'**

The Wi-Fi hot spot has changed that - and more.

Braathen now uses an internet-based phone system, a move that has cut her clients' overseas calling costs to zero. And Braathen no longer complains about broken connections.

"It's so much easier now," she said. "It's great."

Dakota Ridge managers don't know exactly how many residents are using the Wi-Fi system. Dakota Ridge has sold about eight Wi-Fi computer adapters to residents. The service costs \$29.99 a month.

An official with the company that installed the network said that 20 percent to 30 percent of residents use the Wi-Fi network within a typical RV park.

Austin Tucker, director of sales for Austin, Texas-based Coach Connect, said interest among RV parks in the company's Wi-Fi systems has been "incredible."

"We've got 12 parks up and running. We have contracts for a whole lot more," said Tucker.

Tucker noted that RV users typically are an affluent, computer-using bunch. They stay in touch through e-mail. They pay bills online. They download photos of their grandchildren. Or, like Braathen, they run a business from their motor home.

"They're not ignorant. They're thirsty for (Wi-Fi)," said Tucker.

Truck drivers and truck stops also are a target market.

"The truck stop is quite a unique niche. About 25 percent to 30 percent of drivers are walking around with laptops," said Michael Young, director of sales and marketing at TON Services, the Flying J subsidiary that's deploying Wi-Fi for the Ogden, Utah, truck stop operator and diesel fuel distributor.

Young contended that as laptop prices get cheaper, more truckers will buy them.

Truckers, however, don't appear to be flocking to the system - at least not yet. At the Rip Griffin Travel Center in Limon, many weren't familiar with Wi-Fi or didn't own a laptop computer.

But the company that set up the truck stop's Wi-Fi system, San Antonio-based Truckstop.net, thinks truckers are a natural market - partly because of the trucking industry's historic use of communications technology, ranging from CB radios to cell phones and satellite tracking.

Allan Meusi, vice president of Truckstop.net, also said Wi-Fi is a good fit for truckers who need to accomplish a lot when they stop for a break - beyond just fueling up, eating, showering and sleeping.

With Wi-Fi, he predicted, the trucker is "going to be getting his e-mails and corresponding with his family or doing his online banking or other online business transactions."

## **Free hot spots**

What's more, truckers could use the system to line up loads by going to Web sites that match truckers with shippers needing to move freight.

While Wi-Fi users may pay for the service at truck stops or RV parks and elsewhere, free public Wi-Fi access exists, too.

The public library in Evergreen is such a location.

The Jefferson County Public Library introduced the free service at its 10-year-old Evergreen branch last summer and plans to extend it elsewhere.

"It has brought people into the library who might not (otherwise) use the library," said Adrienne Peterson, the library's head of reference and adult services. "We think it's the coolest thing."

Users seem to think so, too. After learning the library offered Wi-Fi, one patron ran home and came back with his laptop - even though the library was closing in 25 minutes.

Software salesman Tony Stowe has adopted the library as his second office. Stowe lives three miles down the road and doesn't have a broadband connection at his home office.

When he's not on the road, Stowe often climbs into his car with his laptop and drives to the library to take advantage of the free Wi-Fi connection. In fact, Stowe says he can spend three out of five days a week at the library, in shifts of up to five hours there.

"It's a heck of a lot cheaper than trying to bring broadband to our home. It's free," said the Evergreen resident.

On a recent evening, Stowe was seated at a desk in one of the library's quiet rooms. The room features a vaulted ceiling, wood paneling and a fireplace.

Stowe was busy on his laptop, trolling the internet for potential software customers.

The quicker Wi-Fi speed makes it easier for him to transfer large data files to prospective customers, as well as to the software company he represents.

But Stowe - who's been in the technology business two decades - is careful not to get too carried away with the Wi-Fi network. For example, he doesn't use it to play online games or other recreational activities.

"I figure I spend enough time in front of a computer," he said.

[fillionr@RockyMountainNews.com](mailto:fillionr@RockyMountainNews.com) or 303-892-2467

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## **APPENDIX H – SERVICE PROVIDER SUMMARIES**

## **APPENDIX I – FINANCIAL PROJECTIONS**

## **APPENDIX J – QWEST**


- Central Offices
- Exchange Maps
- Qwest Brochure

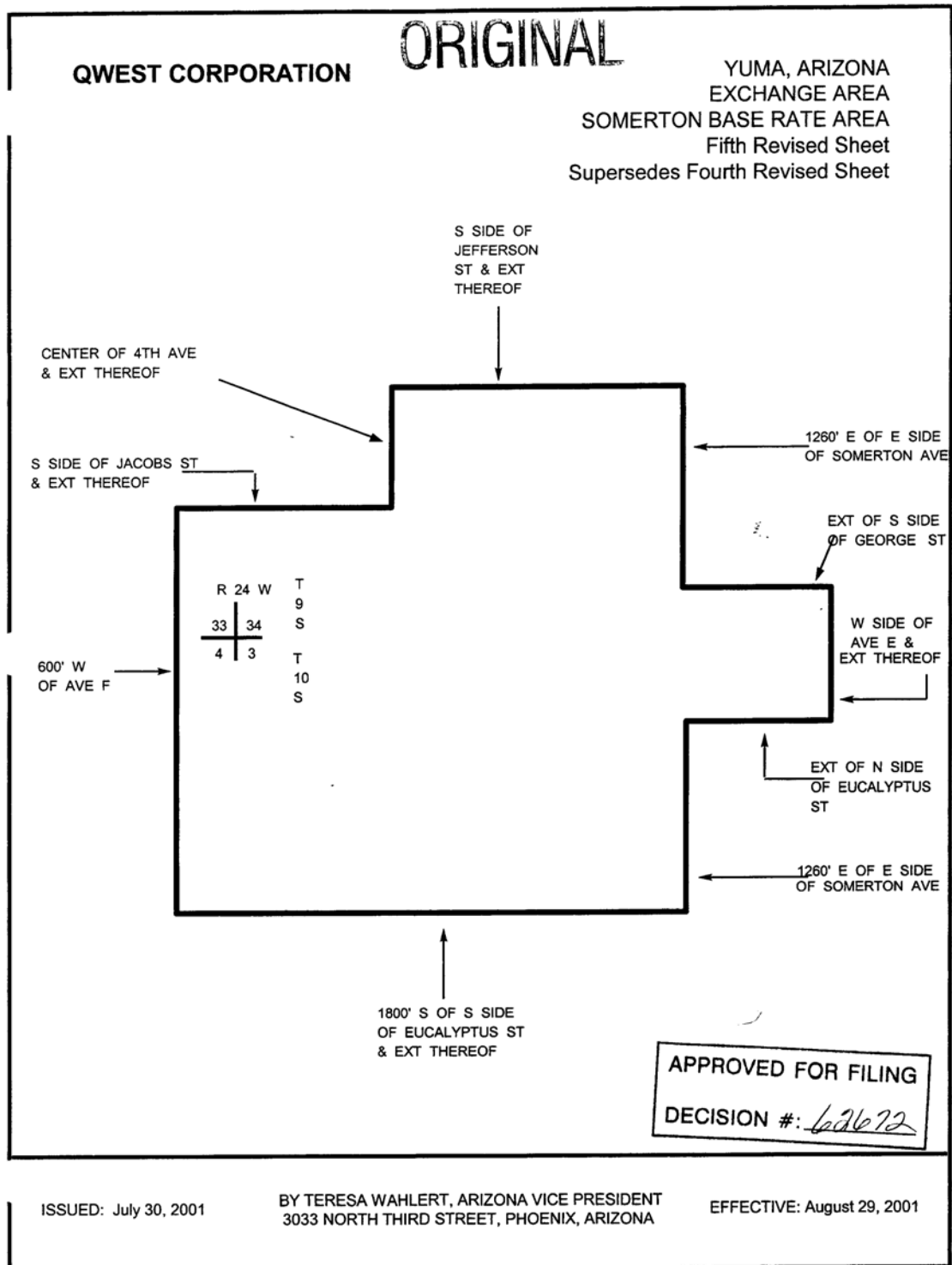
**QWEST CENTRAL OFFICES**

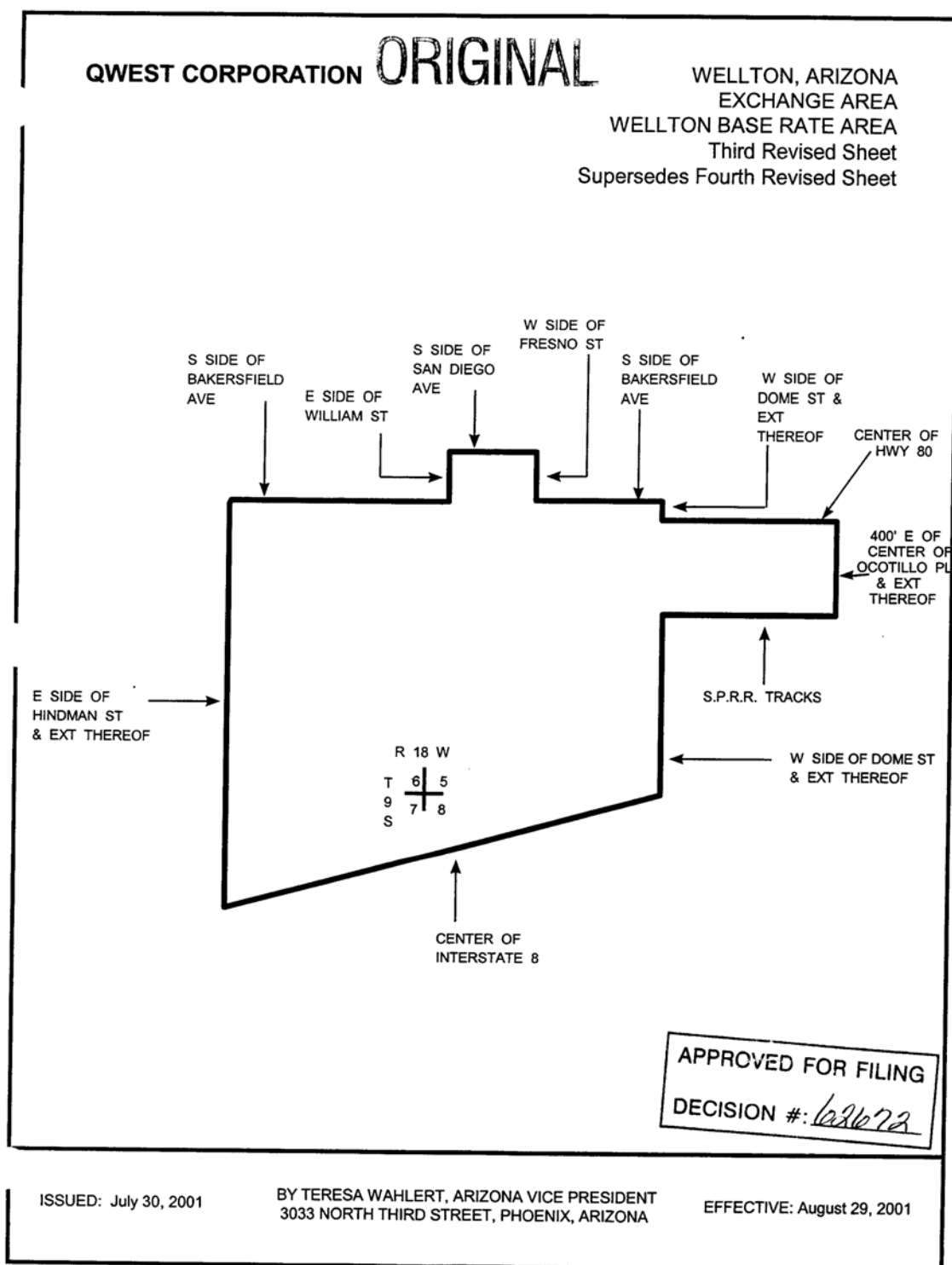
<b>City</b>	<b>Switch Name</b>	<b>Switch Code</b>	<b>Host Switch</b>	<b>Tandem Switch</b>	<b>Switch Type</b>	<b>Switch Software</b>	<b>Business NALS</b>	<b>Residential NALS</b>
Somerton	Somerton	SMTNAZMARS1	YUMAAZSEDS0	PHNXAZMA07T	RSC	LEC015	1,754	6,871
Wellton	Wellton	WLTNAZMARS1	YUMAAZSEDS0	PHNXAZMA07T	RSC	LEC015	437	1,880
Yuma	Yuma Fortuna	YUMAAZFTDS1		PHNXAZMA07T	DMS100	LEC015	1,120	12,632
Yuma	Yuma	YUMAAZMADS0		PHNXAZMA07T	DMS100	LEC015	11,990	20,896
Yuma	Yuma Southeast	YUMAAZSEDS0		PHNXAZMA07T	DMS100	LEC015	8,026	16,267

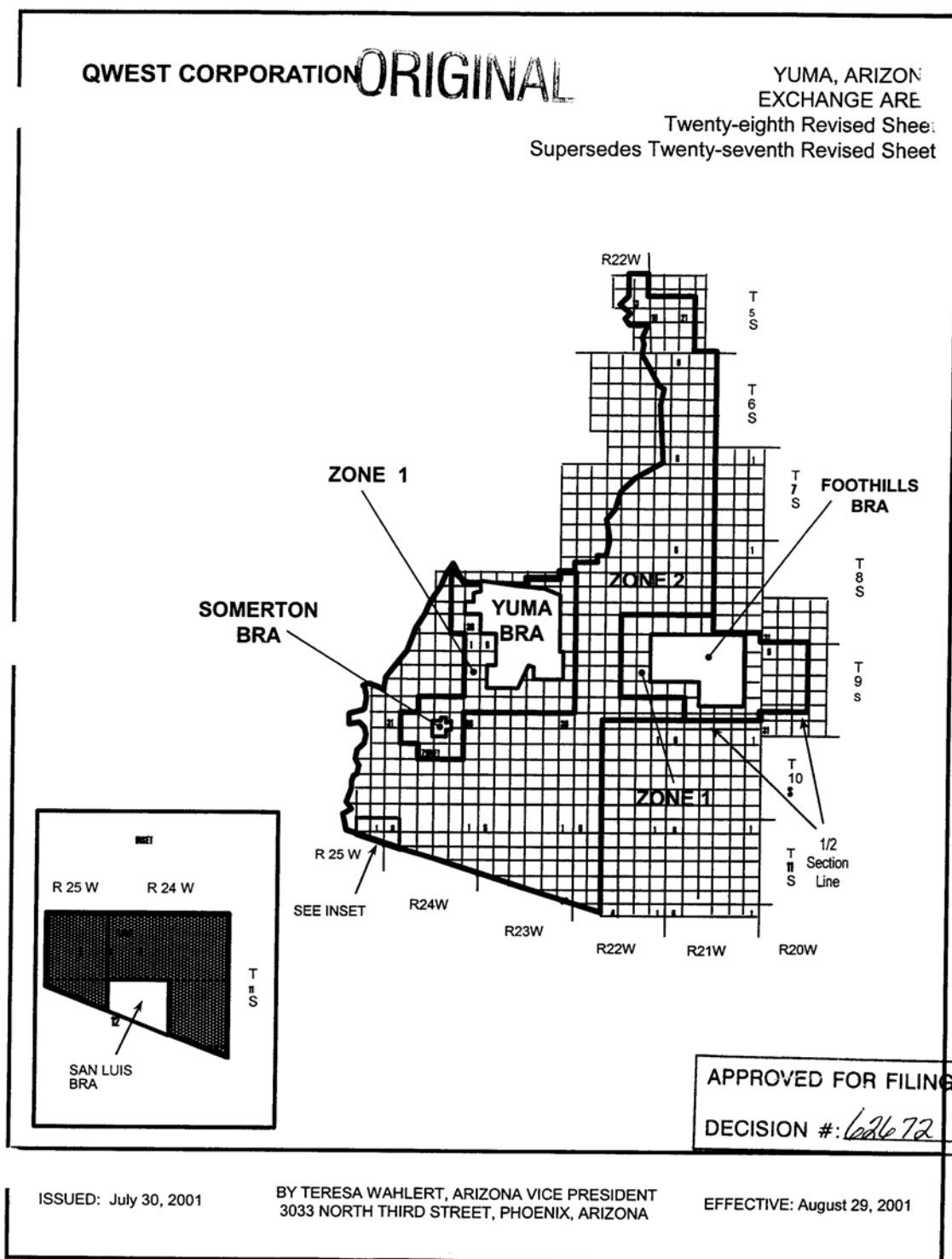
Source: Qwest ICONN Database, 2002

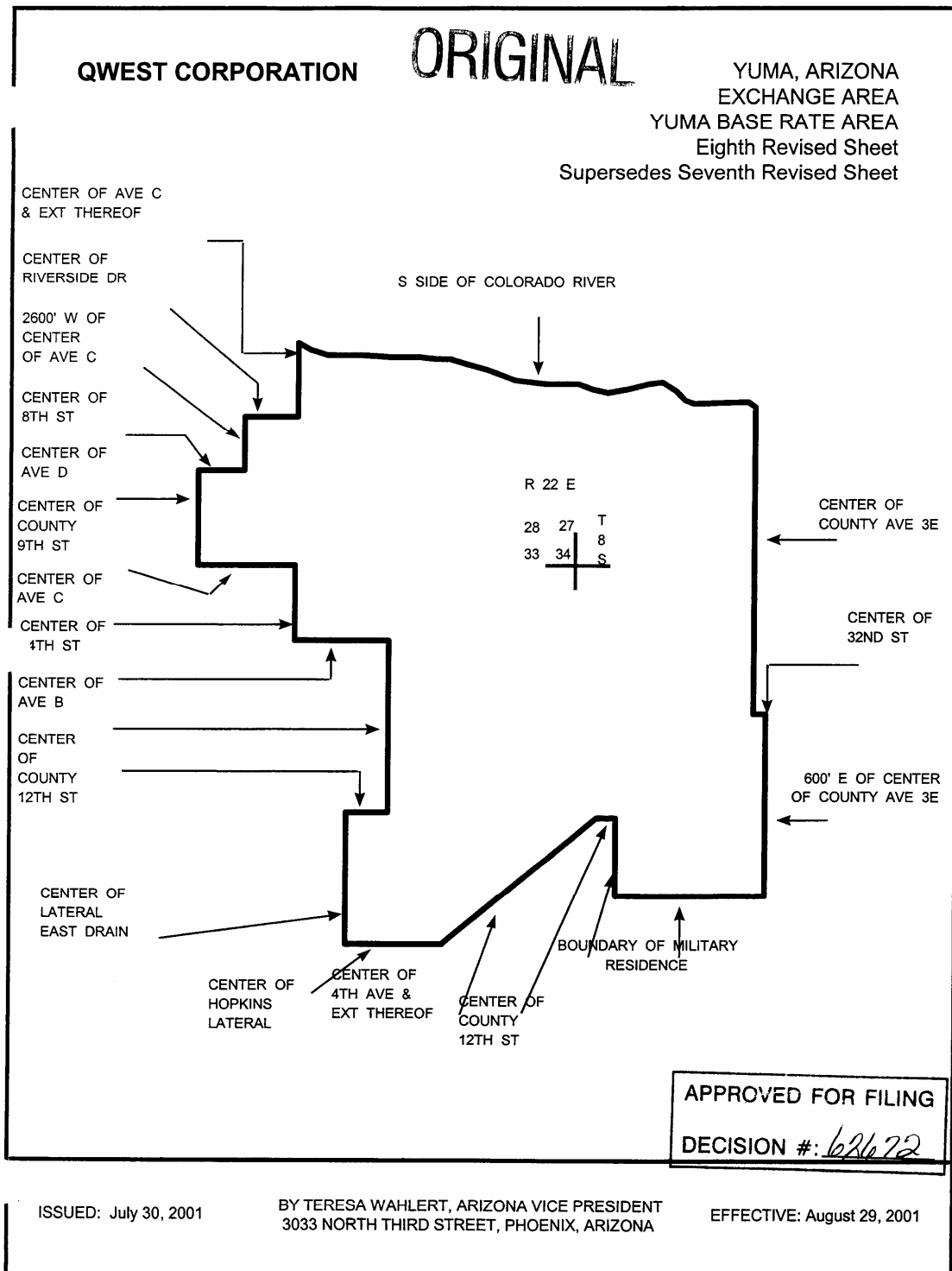


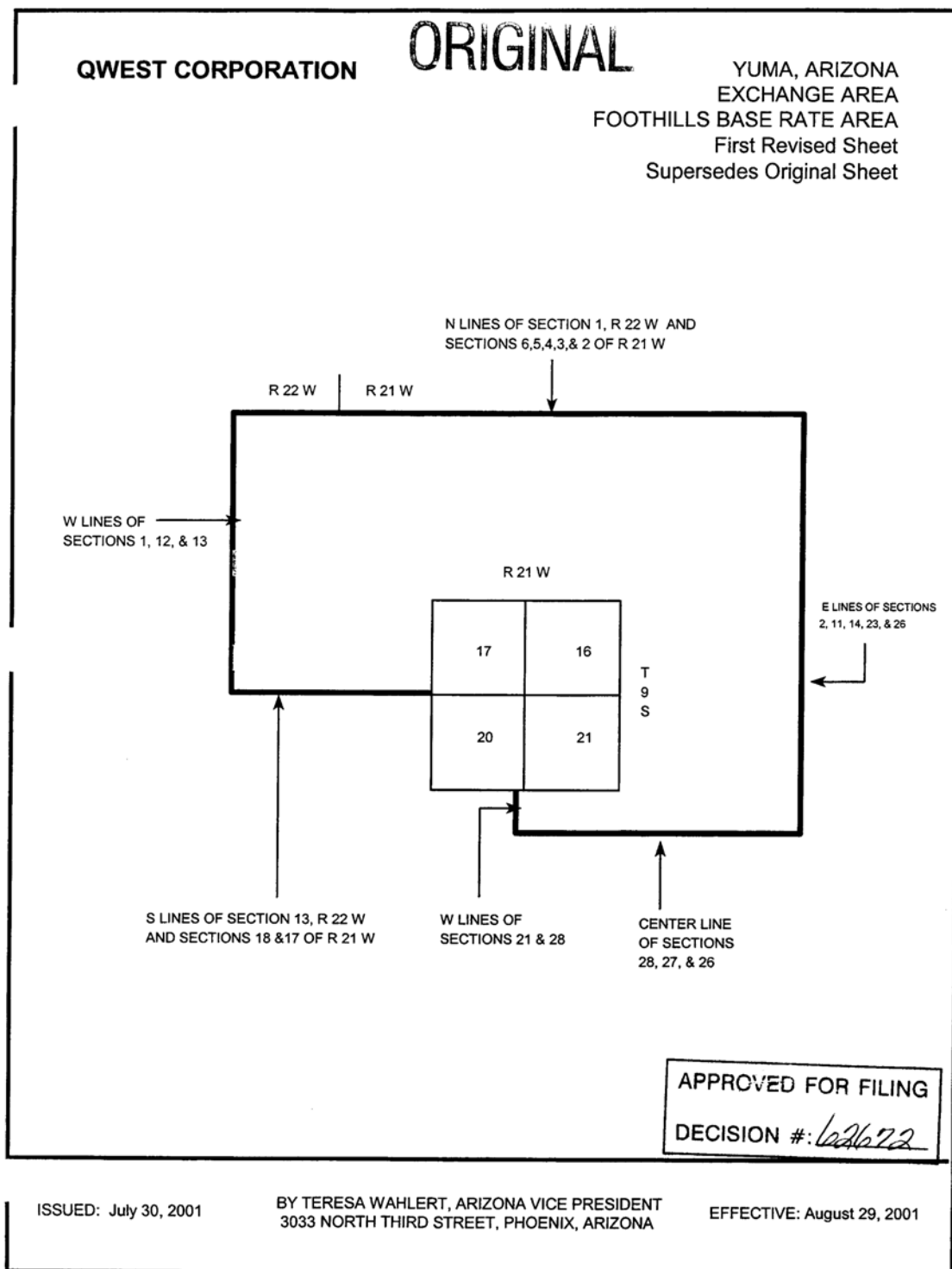
<b>QWEST CORPORATION</b>		<b>ORIGINAL</b>	<b>YUMA, ARIZONA EXCHANGE AREA SAN LUIS BASE RATE AREA First Revised Sheet Supersedes Original Sheet</b>
			
		<b>APPROVED FOR FILING</b> <b>DECISION #:</b> <i>62672</i>	
ISSUED: July 30, 2001	BY TERESA WAHLERT, ARIZONA VICE PRESIDENT 3033 NORTH THIRD STREET, PHOENIX, ARIZONA		EFFECTIVE: August 29, 2001











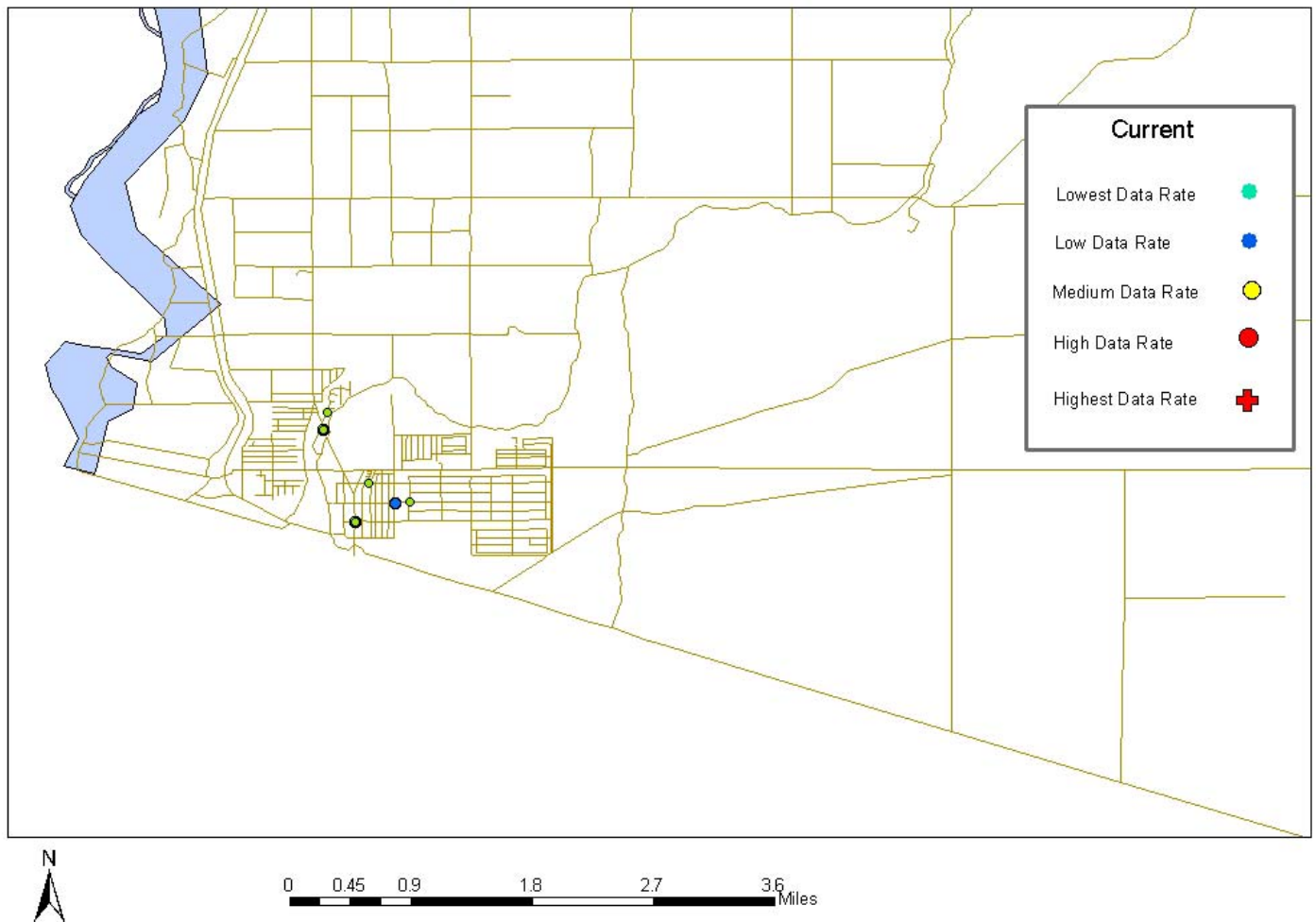
**APPENDIX K– MAPS**

- City Maps of Demand
- Local Provider Locations



**SAN LUIS – CURRENT**

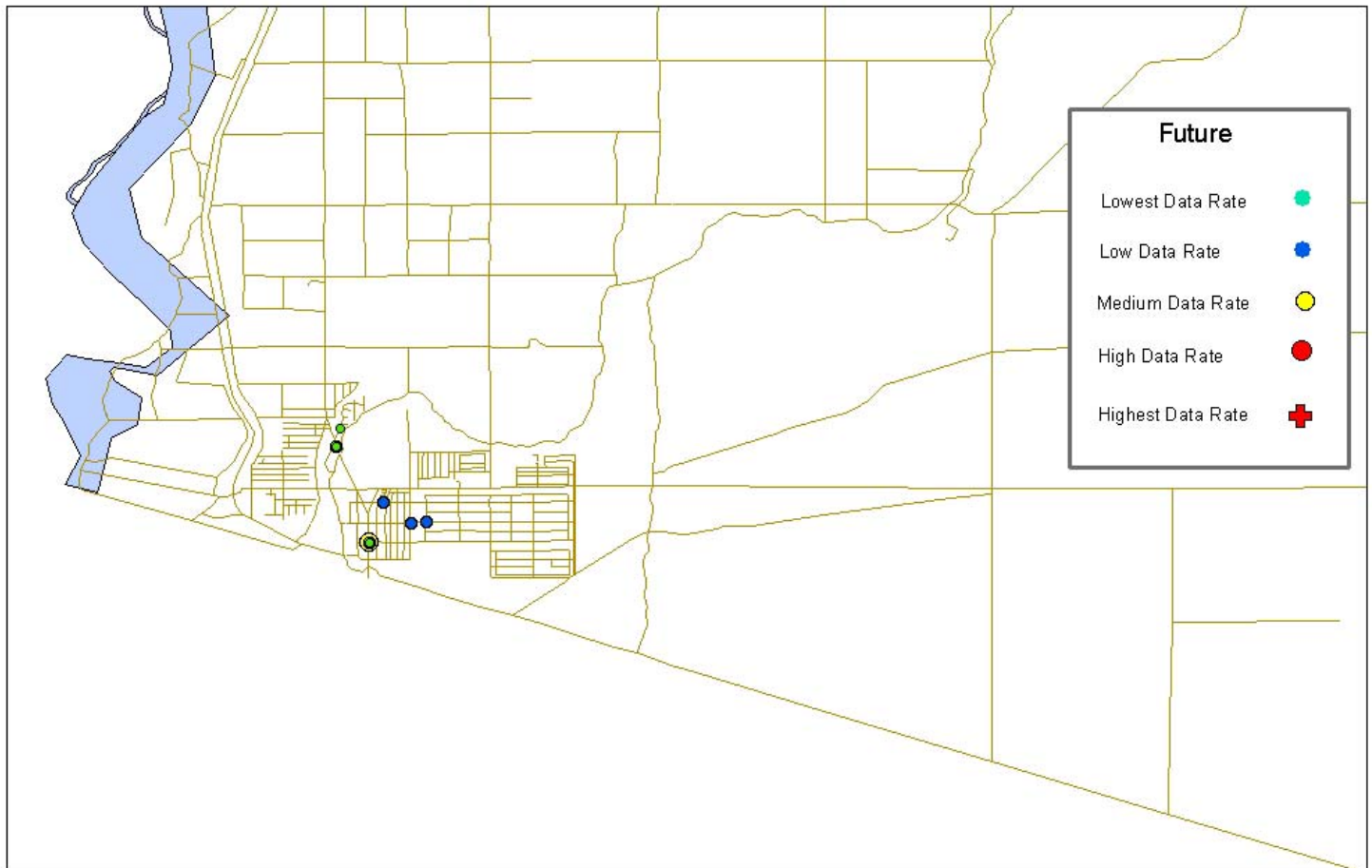
San Luis



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**SAN LUIS – FUTURE**

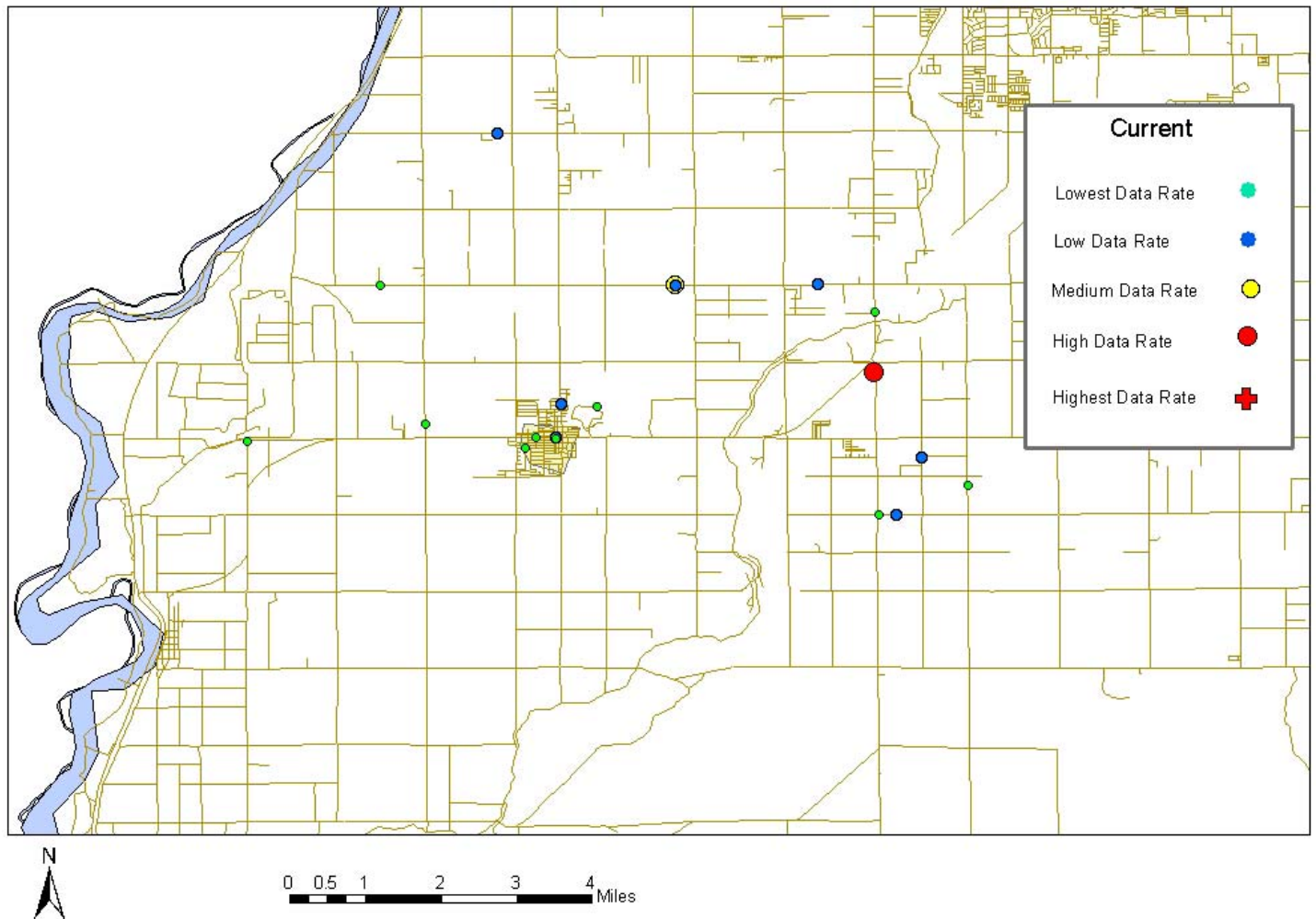
San Luis



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**SOMERTON - CURRENT**

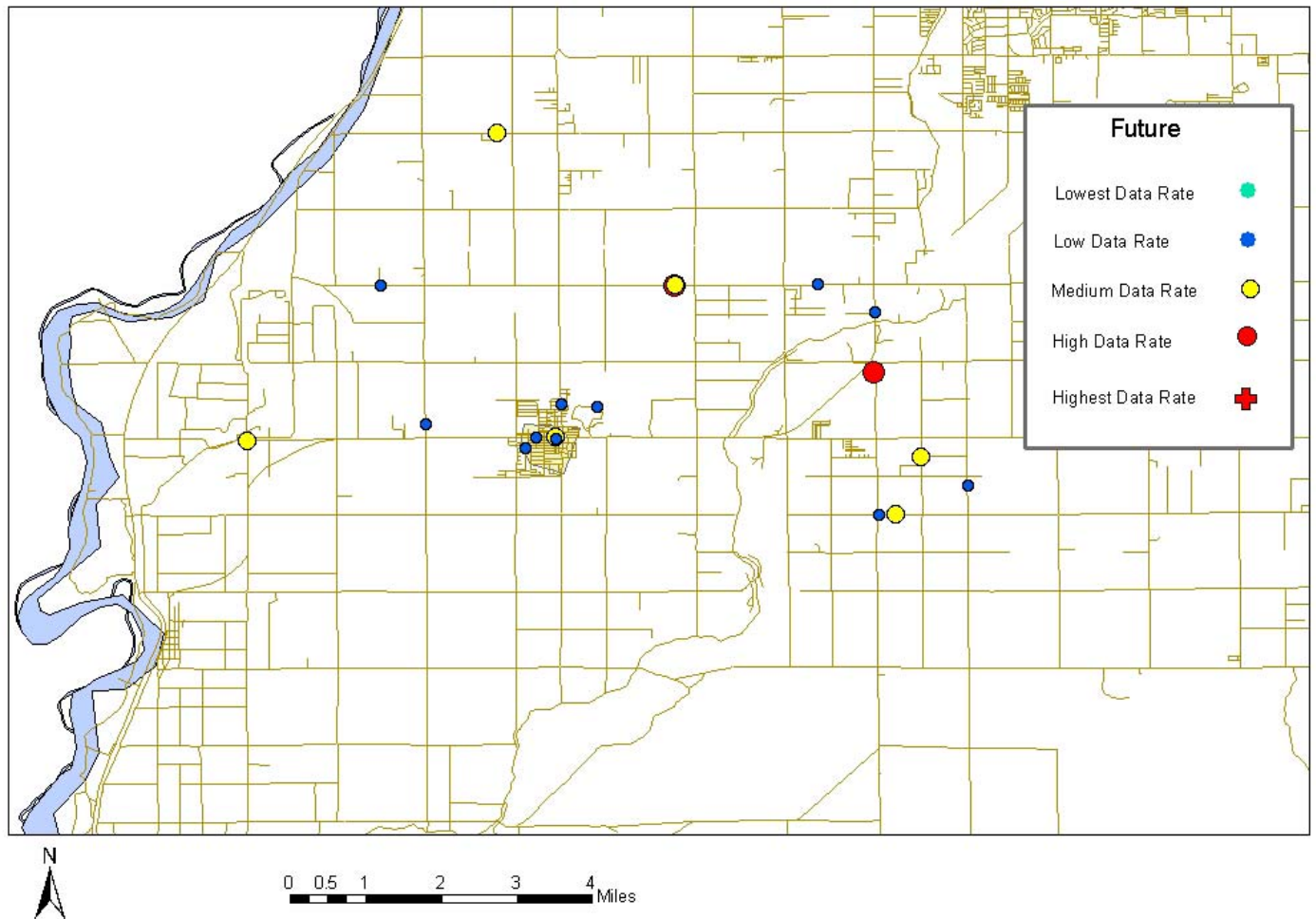
Somerton



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**SOMERTON – FUTURE**

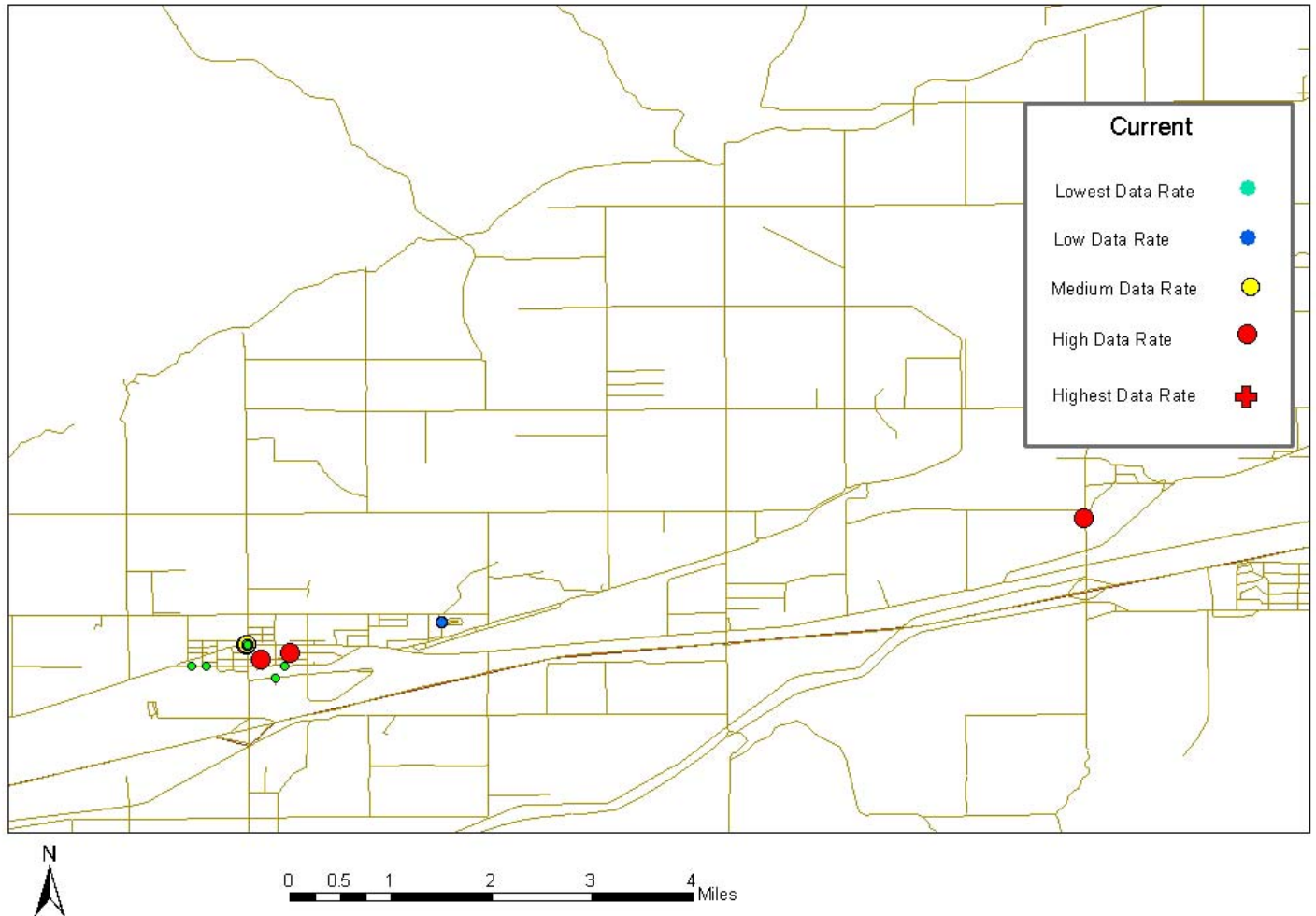
Somerton



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**WELLTON – CURRENT**

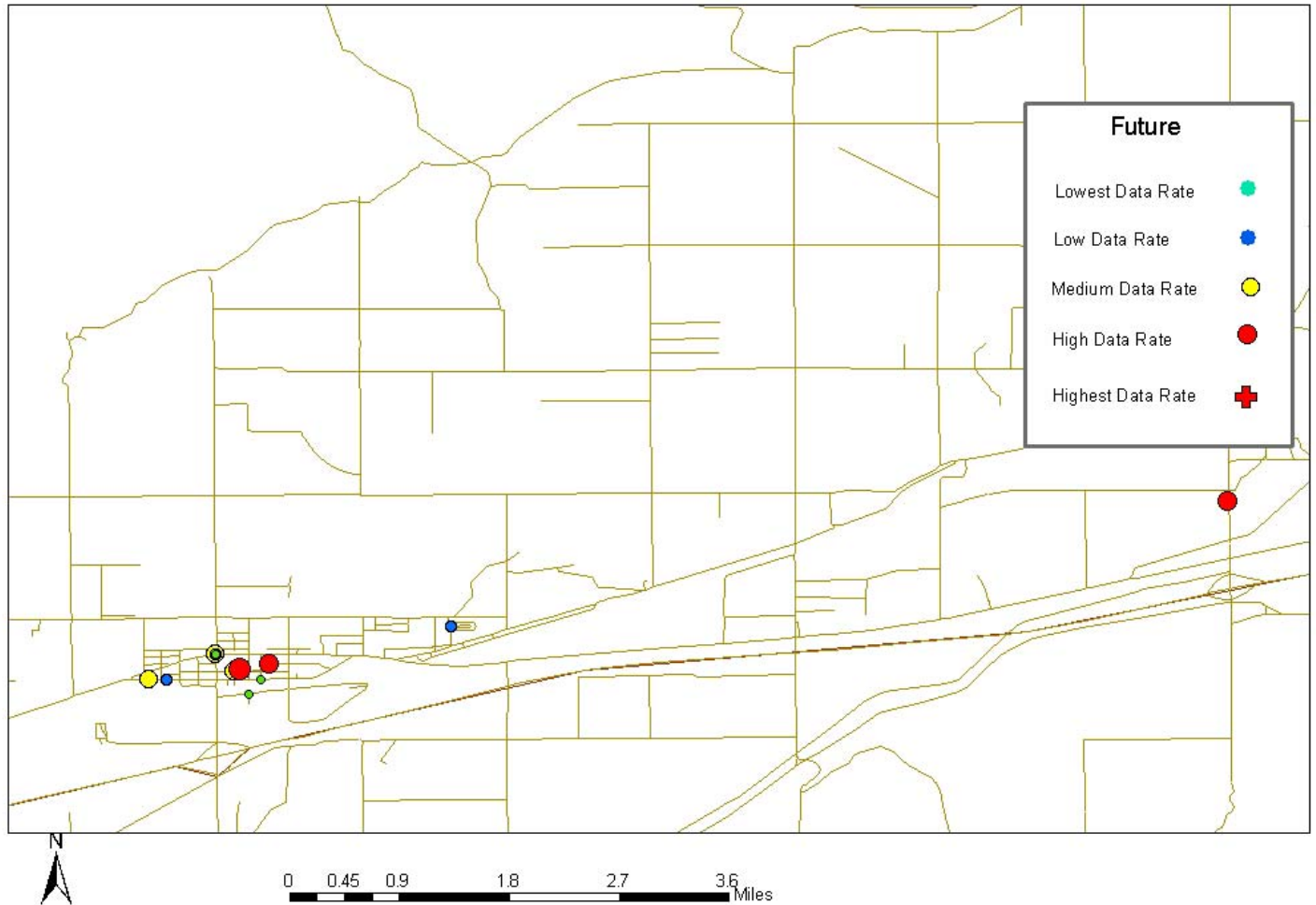
Wellton



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**WELLTON – FUTURE**

Wellton

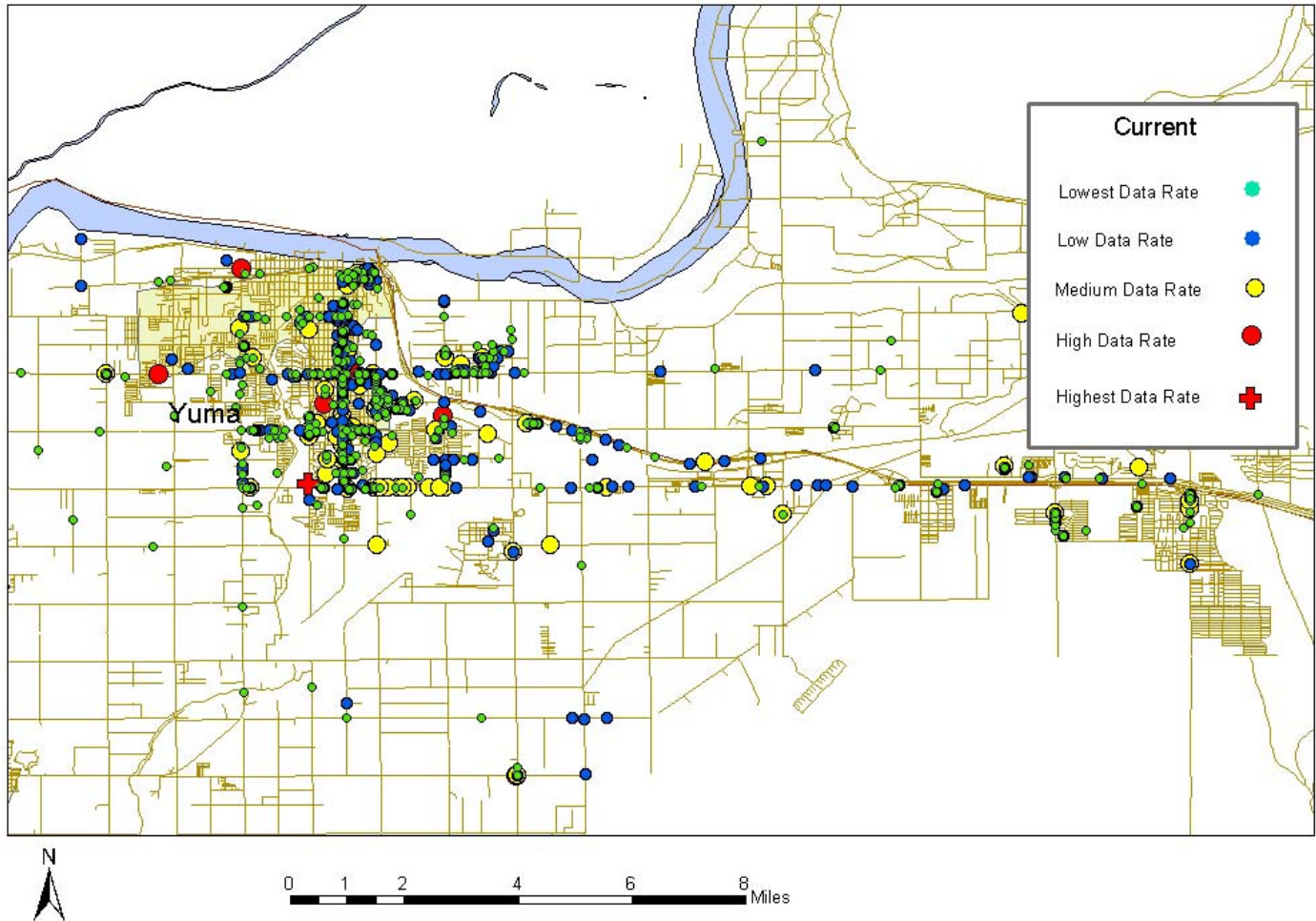


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**YUMA – CURRENT**

Yuma

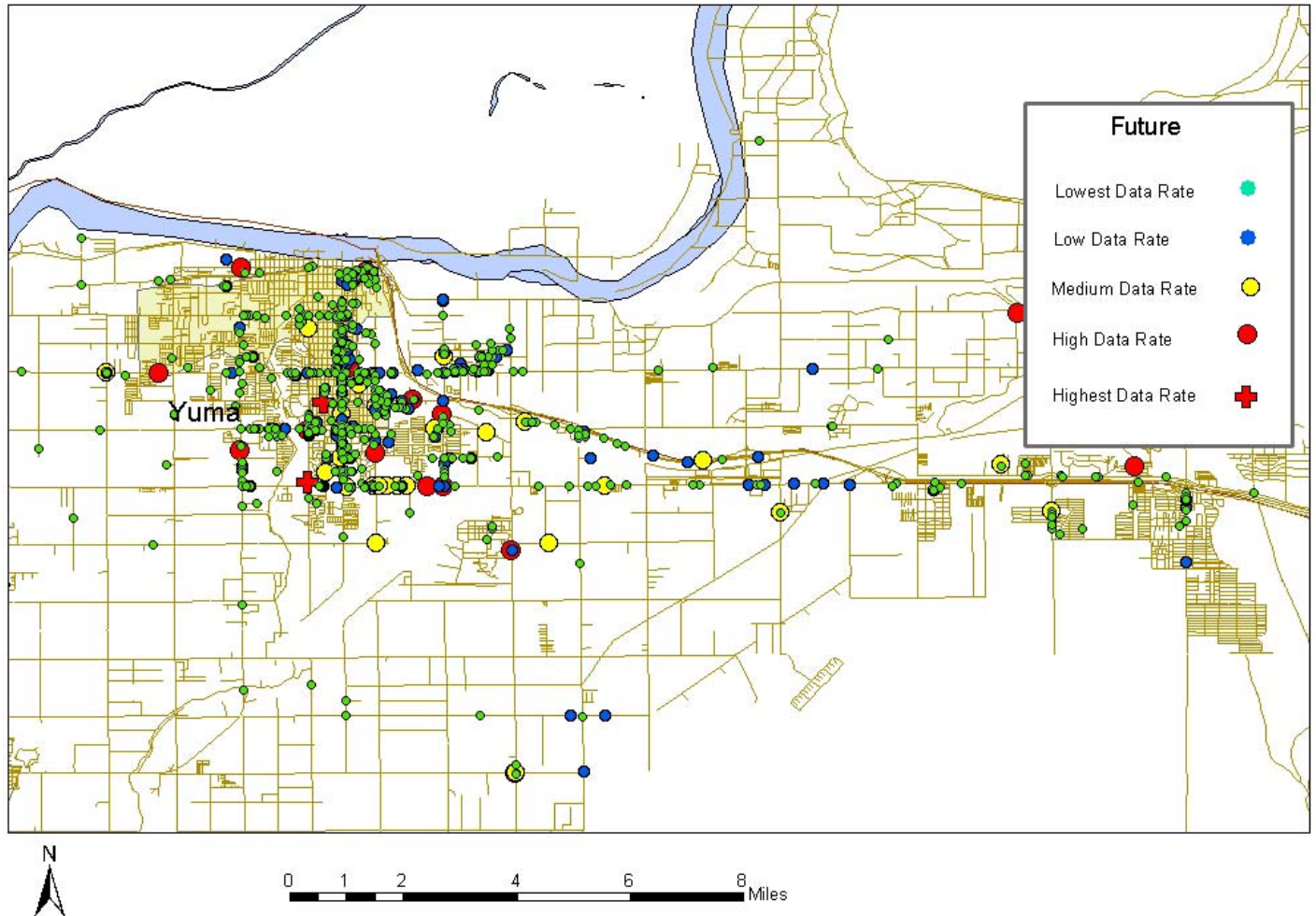


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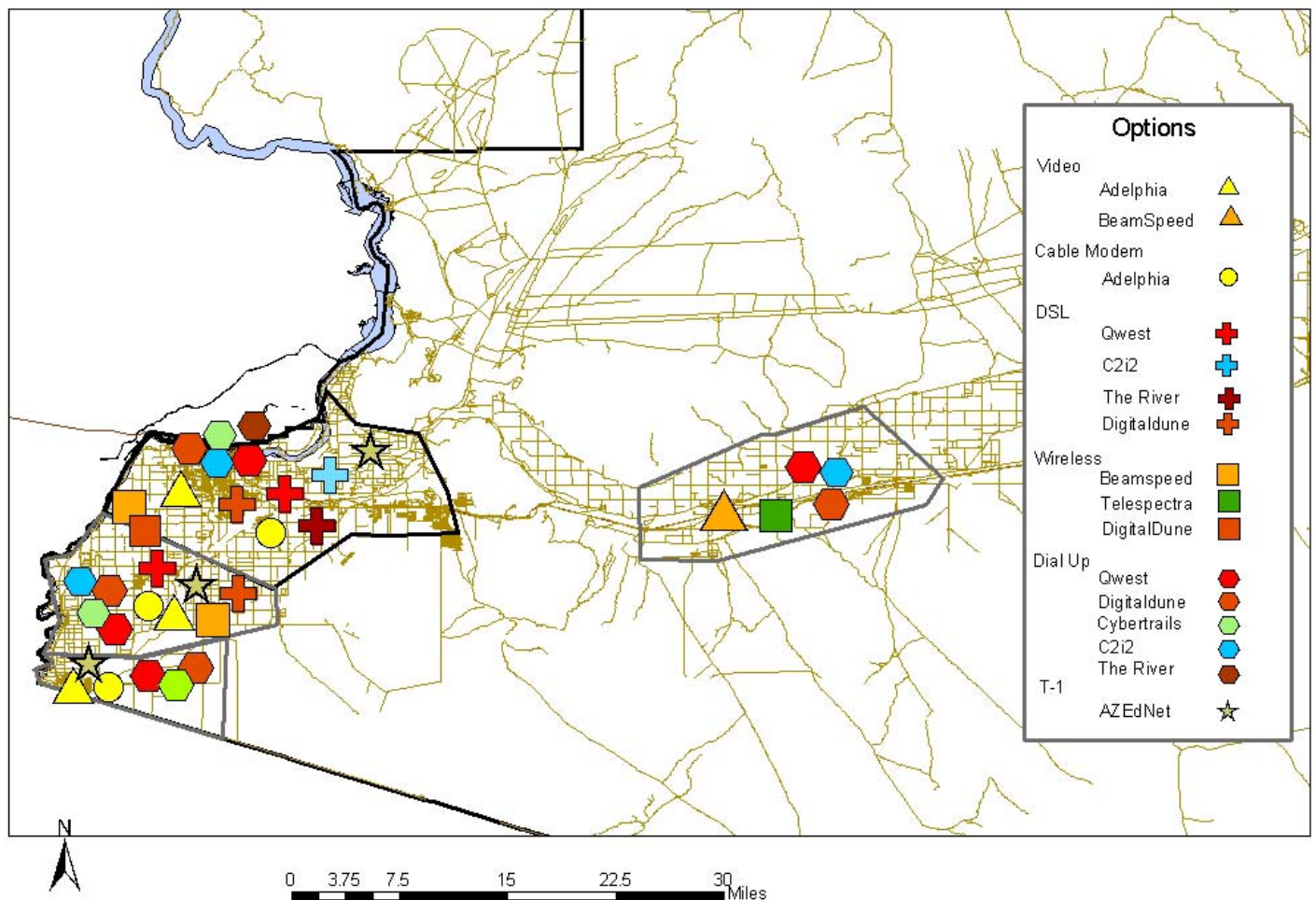


**YUMA – FUTURE**

Yuma



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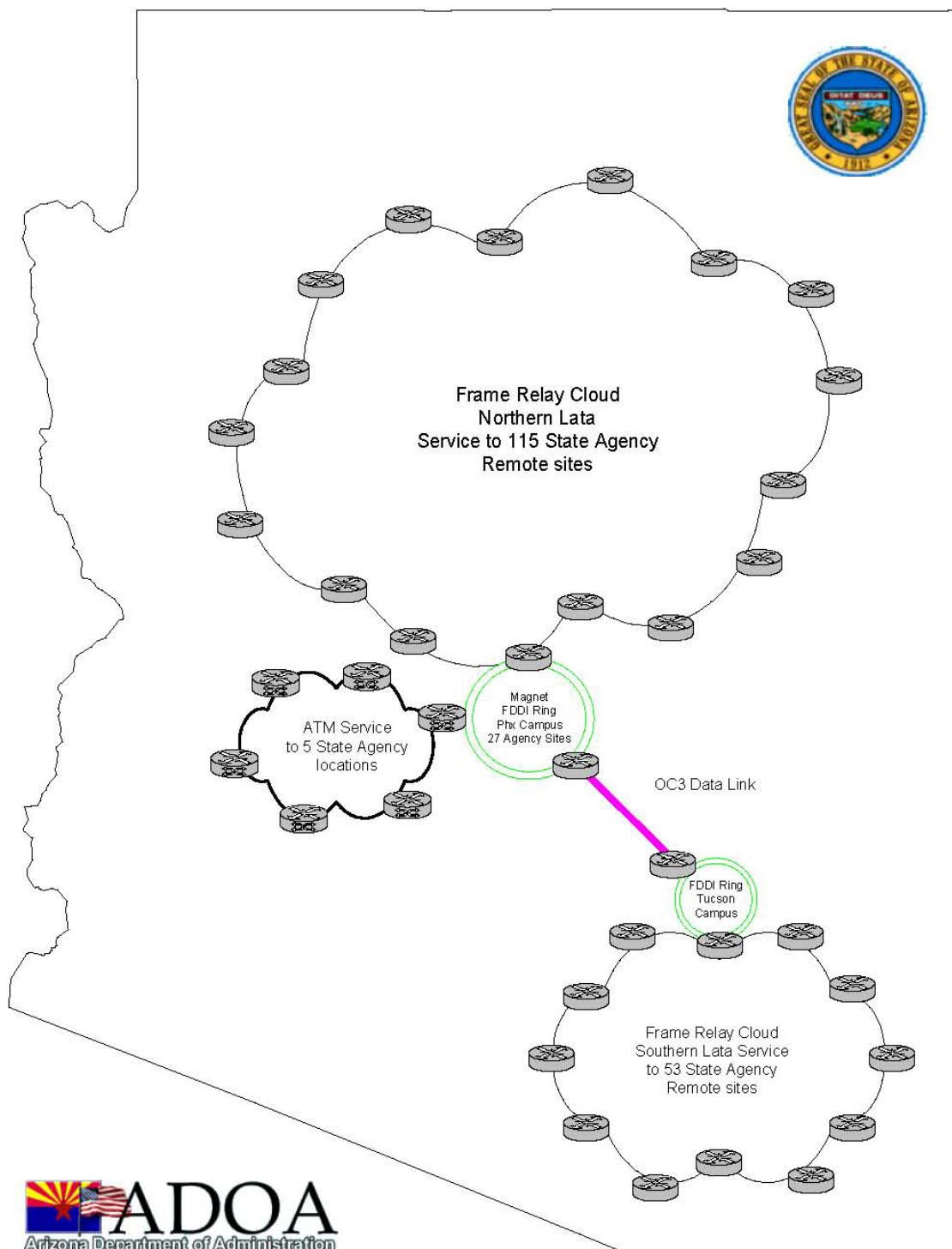
**LOCAL INFRASTRUCTURE PROVIDERS**Yuma County  
Infrastructure Options

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## **APPENDIX L – STATE TELECOM**

- Statewide IT Network Diagram

## ADOA/ATS "State-wide" IT Infrastructure Support Overview



## APPENDIX M – GLOSSARY

### GLOSSARY of Common IT Terms

**ATM:**

ATM (asynchronous transfer mode) is a dedicated-connection switching technology that organizes digital data into 53-byte cell units and transmits them over a physical medium using digital signal technology. Individually, a cell is processed asynchronously relative to other related cells and is queued before being multiplexed over the transmission path. Because ATM is designed to be easily implemented by hardware (rather than software), faster processing and switch speeds are possible. The pre-specified bit rates are either 155.520 Mbps or 622.080 Mbps. Speeds on ATM networks can reach 10 Gbps. Along with Synchronous Optical Network (SONET) and several other technologies, ATM is a key component of broadband ISDN (BISDN).

(ATM also stands for *automated teller machine*, a machine that bank customers use to make transactions without a human teller)

**Analog:**

Way of sending data in which the signal is similar, or analogous, to the original signal. Analog signals are continuous expressions of electricity, as opposed to digital signals in which there is an alternating absence and presence of signal.

**Architecture:**

Arrangement and design orchestrating the interaction of different elements of a complex communications system.

**Asynchronous:**

Transmission method in which information is transferred one discrete character at a time and is delineated by a start and stop indicator at the beginning and end of the character. The opposite of asynchronous is *synchronous* transmission.

**Analog Mobile Wireless:**

Voice and data services that are transmitted over networks using analog protocols to people using wireless devices that do not require staying at a fixed location.

**Backbone:**

Part of the communications network that carries the heaviest traffic. It joins the LAN using a bridge or a router and serves as a communications highway for LAN to LAN traffic. It is also a basis of design for the overall network.

**Bandwidth:**

The capacity of a transmission channel to move data among locations.

**Bit:**

Smallest unit of digital information utilized by electronic or optical information processing, storage and transmission systems. Bit is shorthand for *binary digit*. Binary technology is based on the representation of data using 1's and 0's in combinations to create a protocol medium for data transmission.

**Bits per Second (bps):**

How many *binary digits* (pieces of data) are transmitted per second? Common speeds include:

**2400 bps** amounts to two average sentences sent per second

**28.8 kbps** seven minutes for a 300 page book

**64 kbps** about  $1\frac{2}{3}$  pages per second (also known as ISDN speed)

**1.544 Mbps** (Megabits per second) sends a 300 page book in about  $1\frac{3}{4}$  minutes – gives VCR quality video and is also approximate speed for DSL, T-1 or DS-1 lines

**30 Mbps Speed** of most cable modems

**45 Mbps** Speed of T-3 or DS-3 connections

**155 Mbps** OC-3 line speed – transmits 14 books (300 pages each) per second

**80 Gbps** (Gigabits per second) Speed of most fiber optic backbones – capable of transmitting 7,000 books (300 pages each) in one second. (That's 3.1 million books in an hour or 75 million books in a single day!)

**BOC:**

Bell Operating Company – the local Bell Telephone company, also called “Baby Bells” which were operating units of the original, and monopoly, Bell Telephone Company (aka “Ma Bell”). Currently there are 22 BOCs that are owned by (organized into) seven Regional Bell Operating Companies (RBOC).

**Bridge:**

Data communications device that connects two or more network segments and moves data between them.

**Broadband:**

Typically refers to communication or data transmission using fiber optic networks, but can also be defined as data transmission speed greater than 45 Mbps (T-3 line speed).

**Byte:**

Smallest unit of information that a computer system can locate within its data storage or memory. A byte consists of eight (8) bits and represents an amount of information roughly equivalent to a single printed or typewritten character. A byte is bigger than a bit.

**CCITT:**

Consultative Committee on International Telegraph and Telephone – this is the international standards issuing entity for digital telecom networks. They establish guidelines and standards for things like ISDN.

**CLEC:**

Competitive Local Exchange Carrier – refers to a company that competes with the BOC for provision of local telephone service to customers. Often these companies are existing long distance, internet service or cable service providers. Term was originally coined for the deregulated, competitive telecommunications environment touted by the federal Telecommunications Act of 1996.

**Cable:**

Cable TV network comprised of fiber and/or coaxial cable. Modern cable networks can use cable modems to enable two-way high-speed internet access.



**Cable Modem:**

Small electronic device that allows a computer to access the internet via a local cable provider. Typically have faster speeds than telephone (dial-up) modems. (See modem)

**Central Office:**

Often referred to as the CO, term applies to phone company location of switches and other network distribution, transmission equipment.

**Connectedness:**

The measure of how well connected to the internet a person is.

**DSL:**

Digital Subscriber Line service provides high speed internet access over traditional copper telephone infrastructure and is usually available only to locations within 18,000 wire feet of a local exchange carrier's central office.

**Data Compression:**

Technique used to decrease the amount of computer memory space or transmission resources required to handle a given amount of data. Usually achieved through the applications of mathematic algorithms to the data transformation process.

**Dial-up Internet access:**

Obtaining connectivity to the Internet by using a modem and standard telephone line to connect to an Internet Service Provider or other provider of Internet service. Maximum access speed is 56kbps.

**Digital:**

Use of binary code to represent information. This type of signal can be replicated precisely which is beneficial in transmissions involving long distances where the signal may lose strength along the way, picking up static and other interference. Instead of merely amplifying the signal (like analog does), the code is 'filtered' to delete the noise and then transmitted. An additional benefit is that digital technology is becoming cheaper and more powerful, while analog technology is becoming outdated.

**Digital Signature:**

An authentication process using encryption to ensure that a communication that has been received has not been tampered with.

**Digital Switch:**

Connection device in which binary encoded information is routed between input/output ports by means of time diversion multiplexing rather than by dedicated circuits.

**Ethernet:**

Local area data communications network, originally devised by Xerox Corp. The network accepts transmission from computers and terminals.

**Fiber:**

Refers to communications transmission lines made of ultra-pure glass. It carries a digital signal made of modulated light. It is capable of carrying more data, at much faster speeds, than traditional copper phone lines. (See optical fiber)



**Firewalls:**

A software process for protecting undesired access to a network or access device.

**Fixed Wireless:**

Service that is provided wirelessly to a device that is located in a single place and not mobile.

**Head-end:**

Term commonly used in the cable industry to refer to a distribution site or piece of equipment that sends signals to multiple users over a geographic area. Similar to the Central Office (CO) of a BOC or CLEC.

**High-speed Access:**

Access to the Internet at transmission speeds greater than 128kbps.

**IEEE:**

Institute of Electrical and Electronics Engineers, Inc - IEEE is a non-profit, technical professional association of more than 380,000 individual members in 150 countries. Through its members, the IEEE is a leading authority in technical areas ranging from computer engineering, biomedical technology and telecommunications, to electric power, aerospace and consumer electronics, among others.

**ILEC:**

Incumbent Local Exchange Carrier – applies to the BOCs and small independent telephone providers who provide local telephone service to customers.

**ISDN:**

Integrated Services Digital Network – a switched network that provides end-to-end digital connectivity for simultaneous transmission of voice and/or data over multiple, multiplexed communications channels. ISDN uses transmission and out-of-band signaling protocols that conform to internationally defined standards (set by the CCITT).

**ISP:**

Internet Service Provider. A company or organization that provides a user with a connection for their computer to the Internet.

**IT:**

Information Technology – general term applied to most aspects of any type of communications system, mode, network or equipment used to transmit data (information) from one point to another.

**Informational Websites:**

Websites that only present information - do not allow for any interactivity or transactions.

**Interactive Websites:**

Websites that enable real-time communication and/or transactions between the user and the website.

**Kbps:**

Kilo bits per second. A measurement of the rate of speed that data is being transferred. 1Kbps equals 1,000 bits per second.

**LAN:**

Local Area Network – a geographically localized network that consists of both hardware (computers) and software (programs). A LAN links peripheral devices (computers, workstations, printers). LANs are usually limited to an individual building or group of buildings and is under some sort of formal control.

**LATA:**

Local Access Transport Area – the geographic area within which telephone calls can be handled without going through a long distance carrier (like AT&T, Sprint or MCI). Calls across LATA boundaries (which were established in a federal court proceeding in 1984) must go through a long distance phone company. LATA lines also provide a way of determining where BOCs can offer service and were the means of determining how the assets of the original Bell Telephone Company were divided between the BOCs and AT&T. These are not the same as area codes.

**Last Mile:**

Term referring to the challenges of delivering service (local phone, long distance, cable or broadband) to the final destination. In some circles, this is referred to as the “first mile”. In many cases, especially in rural locations, the last mile infrastructure, if it exists, is old and has limited capacity to support newer, faster modems and computers.

**Local Loop:**

Usually a physical line (often copper), it is the communication channel between a customer’s location and the service provider’s central office. It is also called a subscriber loop, especially by the cable industry.

**Local Number Portability:**

Ability to change phone companies (local exchange carriers) without having to change phone numbers.

**Microwave:**

A transmission method that employs use of electromagnetic waves in radio frequencies above 890 MHz and below 20 GHz. Electromagnetic waves travel only in straight lines and are used for communications between satellites and towers. Use may be limited in mountainous terrain and under certain climactic conditions.

**Mobile Digital Wireless:**

Voice and data services that are transmitted over networks using digital protocols to people using wireless devices that do not require staying at a fixed location. Commonly referred to as cell phone service.

**Modem:**

Stands for MODulator-DEModulator – electronic device that allows computers to communicate over standard telephone lines. The device transforms a digital signal into an analog signal and transmits the signal to another modem which then reconstructs the digital signal from the analog signal.

**Network:**

System designed to provide access path(s) for communications between users at different geographic locations. Usually includes elements for voice, data, facsimile images and/or video images.

**Network Infrastructure:**

The physical plant of wires, switches, routers, hubs, satellites, broadcast towers, dishes, and other hardware that allow communications signals to be delivered across networks.

**OC-1:**

Optical Carrier level one - a set of signal rate multiples for transmitting digital signals on optical fiber. The base rate (OC-1) is 51.84 Mbps. Asynchronous transfer mode (ATM) makes use of some of the Optical Carrier levels.

**OC-3:**

Optical Carrier level 3 – transmission rate is 155.52 Mbps.

**Optical Fiber:**

Optical fiber (or "fiber optic") refers to the medium and the technology associated with the transmission of information as light pulses along a glass or plastic wire or fiber. Optical fiber carries much more information than conventional copper wire and is in general not subject to electromagnetic interference and the need to retransmit signals. Most telephone company long-distance lines are now of optical fiber. Transmission on optical fiber wire requires repeaters at distance intervals. The glass fiber requires more protection within an outer cable than copper. For these reasons and because the installation of any new wiring is labor-intensive, few communities yet have optical fiber wires or cables from the phone company's branch office to local customers (see Local Loop). A type of fiber known as single mode fiber is used for longer distances; multimode fiber is used for shorter distances.

**PANS:**

Pretty Amazing New Stuff (Services) – often referred to as ISDN or broadband capacity.

**POP:**

Point of Presence – refers to an actual physical location where a service provider has the ability for network access. Mostly used to indicate an access point to the internet.

**POTS:**

Plain Old Telephone Service – refers to simple voice telephone communications without any added features like call waiting, voice mail or caller ID.

**Packet-switched Data Transmission Service:**

A service that provides for the transmission of data in the form of packets, switches data at the packet level, and may provide for the assembly and disassembly of data packets.

**Point-to-Multipoint:**

A distinctive type of multipoint connection, composed of a central connection endpoint (central CE) and other, peripheral, CEs, and in which data originating from the central CE are received by all other CEs, and data originating from peripheral CEs are received only by the central CE. Peripheral CEs cannot communicate directly with each other.

**Point-to-Point:**

Communications between two designated stations only. Typically involves a dedicated line.

**Portal:**

A website that aggregates content and provides a methodology for accessing that content.

**Privacy Policy:**

The stated methodology used by a website for handling information collected on users of that website.

**Public ports:**

Publicly available data jacks where people can plug in their access devices to connect to the Internet. NOT the same as a POP.

**Real Time:**

Transmission or data processing mode in which the data is entered in an interactive (two-way communicating) session.

**Redundancy:**

Refers to a network that has a back-up system to ensure uninterrupted service in the event of failure of the main (primary) system. Usually a ring configuration, so that if one way out is blocked or impaired, there is an alternate route to carry the signal.

**Remote Access:**

Ability to send, receive and retrieve data to and from a computer through communications lines such as phone or cable lines. May also use wireless access.

**RBOC:**

Regional Bell Operating Company – one of the original seven (7) companies that managed the BOCs after the break-up of the old 'Ma Bell' network into local service providers and long distance service. The original seven RBOCs were – Ameritech, Bell Atlantic, BellSouth, NYNEX, Pacific Telesis (PacTel), Southwestern Bell and US West.

**Satellite:**

A microwave receiver, repeater or regenerator that is in orbit around the Earth. May be in a stable and fixed location or may be in a low earth orbit (called LEOS).

**SONET:**

Synchronous Optical NETwork - the American National Standards Institute standard for synchronous data transmission on fiber optic. The international equivalent of SONET is synchronous digital hierarchy (SDH). Together, they ensure standards so that digital networks can interconnect internationally and that existing conventional transmission systems can take advantage of optical media through tributary attachments. SONET provides standards for a number of line rates up to the maximum line rate of 9.953 gigabits per second (Gbps). Actual line rates approaching 20 gigabits per second are possible. SONET is considered to be the foundation for the physical layer of the broadband ISDN (BISDN). Asynchronous Transfer Mode (ATM) runs as a layer on top of SONET as well as on top of other technologies. SONET defines a base rate of 51.84 Mbps and a set of multiples of the base rate known as "Optical Carrier levels (OCx)."

**Synchronous:**

Data transmission mode at a fixed rate. This method eliminates the need for start and stop bits, because the receiver and transmitter work at the same rate. Requires more sophisticated digital equipment but is faster and some would say more reliable.

**T-1:**

Trunk Level 1 – a digital transmission using a dedicated connection that provides transmission capacity at up to 1.544 Mbps. This is the North American digital transmission standard. A T-1 line is capable of transmitting 24 voice conversations at the same time. Also known as DS-1 line.

**T-2:**

Trunk Level 2 – Operates at 6.312 Mbps and is equivalent to 4 times the capacity of a T-1 line. Typically used only by carrier networks, a T-2 line can transmit 96 voice conversations at one time. Also called a DS-2 line.

**T-3:**

Trunk Level 3 – digital transmission speed of 44.736 Mbps (same as 28 T-1s) and can carry 672 voice conversations at once. Also referred to as a DS-3 line.

**Telecommunications:**

Process of converting sound and data into electrical impulses that can be transmitted.

**Telecommuting:**

Using networked technologies to perform work-related activities away from the office or business using information and communication technologies.

**Telephony:**

The process of converting sound into electrical impulses for transmission over a connecting medium such as wires, fiber optics or microwave.

**Terminals:**

Access devices that enable the user to view web pages and transmit e-mail.

**Transactional Websites:**

Websites that enable the user to order and pay for goods and services online. Digitized goods and services can also be delivered online.

**Trunk:**

Line of communication between switching stations.

**Twisted Pair:**

Two copper wires twisted around each other. Twists may vary in length and reduce induction. This is the 'copper lines' referred to in POTS and the average local exchange service product.

**Universal Service:**

The federal program that establishes a 'surcharge' or fee on telephone service to create a fund which purpose is to reduce the cost of providing basic telephone service to every household in the nation. This has been the reason that business service is priced higher, even though the service delivered is the same.

**VPN:**

Virtual Private Network - A virtual private network (VPN) is a way to use a public telecommunication infrastructure, such as the Internet, to provide remote offices or individual users with secure access to their organization's network. A virtual private network can be contrasted with an expensive system of owned or leased lines that can only be used by one

organization. The goal of a VPN is to provide the organization with the same capabilities, but at a much lower cost. May also be called point-to-point network.

**Virus Software:**

Programs that protect a computer or access device from being infected with software viruses that can destroy and/or alter data, applications, and systems.

**WAN:**

Wide Area Network – a computer and voice network with a geographic reach that may be larger than a city or single metropolitan area.

**Wi-fi:**

A local wireless application that operates in 2.4 GHz frequency band using low power (less than 100 mW) in a limited geographic range (less than 100 M). Data transmission rates can reach up to 11Mbps. This is a technology growing in popularity in high density/high traffic areas like airports. Also known as 802.11b technology with newer applications in the 802.11g category (IEEE standards).